

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The Pennsylvania Lawn Mower.

We show in the accompanying illustration the improved Pennsylvania Lawn Mower for 1878, introduced to the trade by Messrs. Lloyd, Supplee & Walton, 625 Market street, Philadelphia. This lawn mower is well known to the trade and has enjoyed a wide popularity since first introduced. In its present form it is still better entitled to favor, as a careful examination of its construction and operation will show that it is an excellent implement. One of its most noticeable features is its lightness—the 16-inch size weighing only 36½ pounds. This is secured in part by the use of a pair of grooved driving wheels instead of a solid roller, in part by hollow shafts, and in part by carrying the cutters on an open frame instead of a drum. The cutters are of the spiral pattern working against a fixed knife, which gives them an action similar to that of the blades of a shears, making them "self-sharpening." The adjustments are very accurate. The driving wheels are connected to the main shaft by a check on each, which permits them to turn independently without interfering with the working of the machine. When the motion is reversed in drawing the machine backward, the clutch prevents the knives from revolving in the wrong direction. The independent action of the driving wheels is important, as in turning corners the motion of the outside wheel keeps the cutters revolving. It also enables a sharp corner to be turned without lifting the machine or, as is almost inevitable with the roller, digging up the ground. The machine is very strong, durable, easy of adjustment and not liable to derangement from any cause. The wooden roller which carries the weight behind is adjustable, so that the grass may be cut as close as is desired. In addition there are means for adjusting all the principal bearings to take up wear, &c. It is evidently the invention of a mechanic who understands the use of materials and has carefully studied the possibilities of improvement and adaptation to average use and care.

The "Acme" Double Acting Steam Pump.

The Valley Machine Co., East Hampton, Mass., the manufacturers of the wrought bucket plunger pump, have recently brought out a new double-acting pump called the "Acme," of which we publish an illustration. This pump has its cylinders and steam chest cast in the same piece as the bed, which has the shape of a hollow column. The position of the valve chest at the point where the cylinder joins the bed, greatly increases the strength. The shaft runs in babbitted boxes, and ample provision is made for taking up wear. The form of the frame renders it very stiff and at the same time gives space for the air chamber within it.

Removal of Phosphorus From Iron.

Mr. W. Baker lately delivered a lecture before the members of the Literary and Philosophical Society, Sheffield, on "Some Experiments for Removing Phosphorus from Iron," which contains some points of interest. Mr. Baker said the metallurgical problem which was the subject of his paper had become more important since the introduction of the Bessemer and Siemens-Martin processes. In making large quantities of mild steel the effect of a small proportion of phosphorus and other elements had been observed more closely, and a more accurate knowledge of their influence on the properties of iron had been acquired. He proposed to give a short account of the methods which had been proposed to purify iron from phosphorus, and to include some failures of his own, which occupied a great deal of his time and labor last year. He showed that the operations of puddling, and the Bessemer process, and the old process of making bar iron direct from the ore in charcoal furnaces effected the removal of phosphorus by oxidation, but at the cost of a certain quantity of the metals. He and others were led to change the mode of attack, but what choice of weapons was open he left them to judge, after quoting a patent taken out by Martin, in 1856, in which he made a wholesale appropriation of ideas. Relying only upon the fact that practically no known process was in successful operation, the experimenter pursued his own ideas, regardless of what might have been done by others. He thought that the fact of such a string of nonsense receiving any recognition by a government office was a disgrace to our Patent Laws. Besides this grasping gentleman, he found a very distinct claim for the use of chlorine in a patent by Rowan, in 1862. Nevertheless, he (Mr. Baker) was desirous to effect, not the oxidation, but the chloridation of the iron, and test the action of such an atmosphere upon the phosphorus. The difficulty of experimenting with fused iron had been much diminished by the introduction of gas furnaces, and he found one of Fletcher's extremely convenient for his purpose. His first experiment was to melt about two pounds of Cleveland pig iron, containing about 1¼ part of phosphorus, and then to introduce cautiously a tobacco pipe stem, through which he could pass a continuous current of dry chlorine gas for an hour. The loss in weight after the operation was about 5 per cent., and the phosphorus was reduced from 1.005 to 0.365 per cent. This appeared encouraging, and a

repetition of the experiment reduced 0.67 to 0.251, while in the olive-green glassy slag he found 0.125 per cent. By other experiments a reduction of about one-half of the phosphorus occurred several times. There was not, however, the marked expulsion of the phosphorus which could be ascribed to the specific action of chlorine. His next experiment with carbonic dioxide was in a graphic pot, and reduced the phosphorus about one-half, the carbon being practically untouched, allowance being made for a little loss during the melting. The second experiment reduced the phosphorus from 0.169 to 0.047. Mr. Baker gave the results of other experiments made by himself, and by others, and in conclusion said it seemed as if the at-

on the Reading road. For instance, passenger engine number 58, running on the Lebanon Valley branch, has traveled since June, 1859, more than 565,000 miles. Number 75, designed by the late James Millholland, is credited with 322,950 miles; number 44, passenger engine, 530,021, and number 57, main line passenger engine, 520,043 miles. The first locomotives owned by this company were built in London, England. Number 1, weighing 11 8-10 tons, is still doing a fair day's work at Port Richmond; has traveled 304,111 miles, and last year made 6451 miles. Number 2, at work at Richmond wharves, ran, in 1877, nearly 7700 miles, a total to 1878 of 331,391 miles. Excepting the express engines Ariel and Transit,

of which will market their cargoes at Chattanooga.

One Phase of Chinese Civilization.

A writer in a Chinese newspaper, the *Celestial Empire*, presents the following interesting picture of the customs of the people of a large and important province of China:

To the southeast of Pao-tung-foo, in Chihli, is a district 180 li by 290, where the people are banded together in communities which recognize each other as one family and have some customs of their own different from the rest of the province. In ordinarily good years those who have a sur-

A better custom, which all China might adopt with immense advantage, is the choice by a certain district of a "chief," who in times of danger from robbers, &c., summons the people to his standard, and always acts as a sort of justice of the peace, judging and sentencing in lighter affairs, and prosecuting in the public interests in more important matters.

One law of the region is that interest on money lent should never exceed 15 per cent., which is a small rate for small loans in China. If any man is found demanding more, this "chief" is made aware of it, and accuses the "usurer" to the district magistrate.

In a village under one of these chiefs a young man opened a pawnshop, being the first known in the neighborhood. For articles pawned by the disreputable or very poor, who alone patronized the establishment, he charged the common pawnshop interest of three per cent. per month. The depositors soon discovered that the interest was extremely heavy, and began to grumble. At last an "advertisement" was sent to the "chief," naming the pawnbroker and mentioning the hardness of the case. The "chief," himself one of the "wealthy" men, discovered that the pawnbroker was a nephew of his own. He at once sent an intimation to the effect that he would make good the loss sustained by every one of the depositors, and formally accused his nephew to the district magistrate, who, because of the excellence of the "chief's" reputation, was unwilling to act where his relation was concerned. "Carry out the law," was the only response of the chief, and, according to the "law" of the place, the pawnbroker was banished beyond the pale, to live among the "Jan" men. We have several men from that "region" here at present.

When a boy is apprenticed to the mercantile trade, he has to find a competent security, who is responsible for his good conduct. The boy is brought on trial for a few days, at the end of which, if he is found stupid, he is sent away; if retained, it is for a life of drudgery for a longer or shorter period. It is his duty to be up before the sun, summer and winter, to sweep out the rooms, brush down the goods' stands and dust everywhere. His life is during that time that of a slave, till time replaces him by another, as he rejoices in the dignity of the salesman, who opens his shutters with the rising of the sun, and closes them in the evening twilight. Wages are very fair, and all mess together in the establishment.

If an apprentice or assistant misbehaves he is advised to reform. If the advice is not acted upon he is dismissed at one of the three terms—first moon after sixth day, when shops are first opened after the holidays; on the fifth of fifth moon, and on the fifteenth of eighth moon. But if an assistant of any kind is discovered to be an opium smoker he is dismissed on the spot, the established custom of terms being repealed for this one offense, the offender not having even a few days granted him to look out for a situation. The reason of this is doubtless that the opium smoker has been always discovered to be utterly ruined in his moral character, and unable to refrain from stealing to gratify the passion of which he becomes the slave, and possibly also because it renders the smoker incapable of exerting his energies, and makes him a lazy workman. At all events he is not trusted.

Notice of dismissal is given by affixing the name of the party to be dismissed outside the kang on which he sleeps. It is done when all are retired to rest, and everybody sees in the morning that "so and so is to look out for a situation."

The iron question as regards the business in St. Louis is still unsettled. The differences of opinion between the Iron Mountain Ore Company and the Railroad Company still exist, and but little ore is being shipped from the Mountain. A little is received each day, but it is all shipped to other points for manufacture. It is possible that the difficulty may be brought to a crisis in a short time by the action of the Railroad Commissioners, whose duty will compel them to enforce the law in regard to freight rates. The Missouri Iron Company is doing a fair business, both in the ore and iron trade. They are receiving about 1200 tons of ore from the Simmons Mountain per week, and about 50 tons of iron is made per day at the Missouri Furnace, with which the Iron Company has a contract. They are shipping the ore to points on the Ohio River. Barges are on the way here now to take a large shipment of ore to Pittsburgh.

The following figures of furnaces in and out of blast in some of the English iron districts and in Scotland are very suggestive:

	In.	Out.	No.
South Staffordshire.....	45	102	147
North West of England.....	53	43	96
Derbyshire.....	34	29	63
Cleveland.....	103	61	164
Northamptonshire.....	14	6	20
Linarkshire, Scotland.....	57	35	92
Ayrshire.....	23	20	43
East Coast.....	5	15	20

The following are the closing remarks of John Roach, when making a speech a few days since, after launching the iron ship *Rio de Janeiro*: Seven months ago the material for yonder vessel, which was launched a half hour ago, was lying in the bowels of the earth. There it was worth \$5000. Today, in its present shape, it represents \$500,000, and that money has gone to the elevation of American labor.



THE PENNSYLVANIA LAWN MOWER FOR 1873.

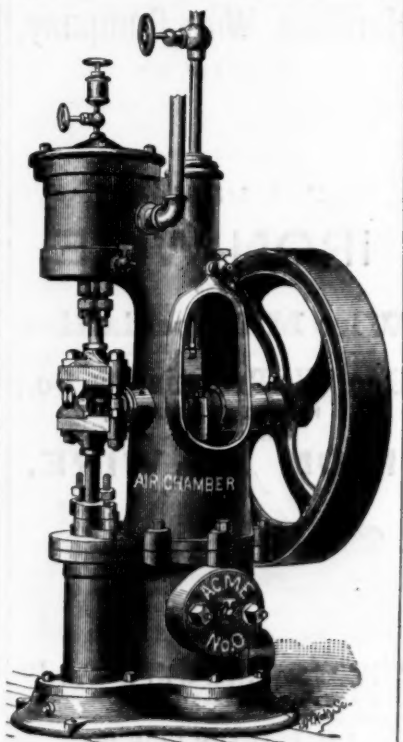
tempts to remove phosphorus by the formation of a gaseous compound were well-nigh exhausted, and that the new efforts should be directed toward some solid combination which might be removed mechanically either as a slag or alloy possessing such distinct physical characters as regarded fusibility or specific gravity as to render separation practicable. It was a most interesting problem, and there was a splendid prize for its successful solution. He believed that a number of reactions which took place at high temperature remained untried, and that, difficult, as it seemed, a scientific investigation of the question with more time and resources than he could command would lead to a successful result.

American Advertising.—The Bristol (England) Mail says: The Americans bent us hollow in the matter of advertising, and it is our firm belief that in the United States the advertiser gets far more value for his money than the manufacturer of any other nation under the sun. With them advertising is reduced, as one might almost say, to one of the fine arts, while in Great Britain we still appear to be even yet in the dark ages of advertising life. There are many reasons for this, into which we cannot enter here. Suffice it to say that the American is more judicious and persistent in what he does. He feels that with so many competitors springing up he must keep himself well toward the front in the commercial world, or else that in time he must inevitably "snuff out." As also the home demand gets overtaken, as it often is, by a too large supply, so does he extend his area of advertising operations, and at the present moment in many of our British colonies—markets which ought to be entirely our own—Yankee "notions" are far better known than many of our specialties far more suited to the locality, simply because practical illustrations and well-written advertisements meet the eye of the consumer in almost every newspaper.

The *Railway World* says: Of the four hundred and odd locomotive engines owned by the Philadelphia and Reading Railroad Company, but 15 were in the Reading machine shops at the close of the fiscal year ended November 30th, 1877. These, General Manager Wootten says, have been in active service for periods varying from 20 to 40 years, and are now unfit for further duty. The large force of 400 hands are busily engaged on repairs or building new engines to take their places. During last week five were turned out of the shops; one passenger locomotive, number 410; three ten-wheel connected freight engines; and an eight-wheel connected coal-dirt burner number 50. The latter took the place of a 26-ton engine, built by the railroad company in 1858. The Paris Exhibition locomotive will be completed in a few weeks. The average "life" of a locomotive is said to be 500,000 miles, which is not an average for the iron horse

the lightest locomotive weighs but 11 5-10 tons, and the heaviest more than 40 tons.

The Tennessee River Improvement.—To illustrate the importance of the Tennessee River as a transportation route, we have received information from a thoroughly reliable source that there are now building along that stream and its main branches 150



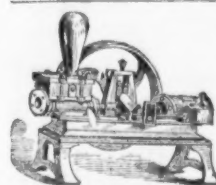
THE "ACME" DOUBLE-ACTING STEAM PUMP.

flat-boats, which will be loaded for Chattanooga. This is exclusive of considerable numbers which will be landed at Knoxville, Loudon and other points. If it is considered that these boats, which carry an average of 2000 bushels each of corn, wheat, &c., and large quantities of other produce, do only a small fraction of the yearly transport on that stream, its importance will be readily apprehended. The steamboats on the river, which ply steadily the year round, do all or nearly all the carrying trade for the main stream. The flat-boats are nearly all built on the smaller tributaries, where steamers never run, and remain loaded a long time, frequently waiting for a "big rise," on which they proceed to market. The usual number of flat-boats out of these streams is about 400; but this year being one of short crops in the valley and its tributaries, the number will probably be reduced to 300, 200

TIN LINED IRON PIPE.

A pure **BLACK TIN PIPE** within a wrought iron tube, combining Purity, Strength, Durability and Cheapness.

TATHAM & BROTHERS,
82 Beekman Street, N. Y.



JAS. CLAYTON.
Water, Air & Vacuum
PUMPS
Air Compressors.
Prices greatly reduced.
Send for circulars.
11 & 16 Water St.,
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O. LINDEMANN & CO.

Manufacturers of
Japanned, Brass and
Silver Plated

Bird Cages.

Original Inventors

Bright Metal

Cages,

Constructed without

solder.

254 Pearl St.,

NEW YORK.

Our cages can be

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OSBORN MFG. CO.
TRADE MARK
BLEECKER ST. NEW YORK.



The Original Inventors and Manufacturers of the
OSBORN BRIGHT METAL CAGES.

Also OSBORN & DRAVTON improvements under
twelve different patents. We are continually bringing
out new and beautiful designs to meet the demands of
refinement and taste.

ALVAN DRAVTON, General Agent.



John Maxheimer

Manufacturer of

Patented

Bird Cages.

Japanned and two kinds

of Brass. With or without

solder.

247 & 249 Pearl St.,

New York.

Catalogue and price list

furnished on application.

W. S. ESTEY,
Manufacturer and Dealer in

Wire Cloths, Wire Goods and Wire

WORK of every description.

Galvanized Twist Netting for Fencing, Henneries,

&c. Foundry Riddles and Steel Casting Brushes.

59 Fulton Street, New York.

THE WORCESTER WIRE CO.,
Cambridge St., Worcester, Mass.

MANUFACTURERS OF

IRON AND STEEL WIRE

OF EVERY SIZE AND GRADE.

Classification List mailed on application.

S. L. SAMUEL,
Hardware Manufacturers' Agent

For EXPORT.

Advances made on consignments.

57 Cedar Street, NEW YORK.

Grant Fan Mill & Cradle Co.

Manufacturers of

Grant's Grain, Coffee, Rice, Cochineal

and Pimento Fans,

and

TURKEY WING CRADLES,

4, 5 and 6 fingers.

GRAPE VINE CRADLES,

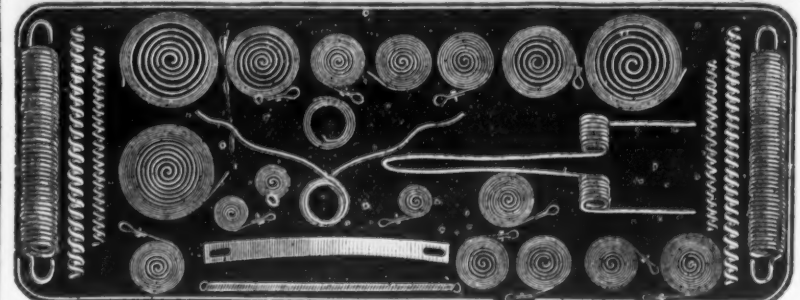
4 fingers.

SOUTHERN PATTERN GRASS,

CRADLES,

CARY & MOEN,

Manufacturers of
STEEL WIRE for all purposes, and **STEEL SPRINGS** of every description.



Market Steel Wire, Crinoline Wire, tempered and covered.
Also Patent Tempered Steel Furniture Springs, constantly on hand.
234, 236 and 238 West 29th Street, NEW YORK.

THE PERFECTION STOVE PIPE.



(PATENTED.)

This article is destined to revolutionize the sale
of Stove Pipe. Fifty joints of 5 in. are securely
packed in a case 10 in. square by 24 in.
long, inside, thus occupying hardly more room
than tin plate, and securing lowest rates of freight.
Entirely made by machinery, every joint is exactly
alike, and fits together with the greatest accuracy
and ease. A child can adjust it, no tools being re-
quired. When put together it forms the strongest
and most perfect pipe in the world. Over each of
the rolls is drawn one joint of pipe to protect the
others from dirt and moisture, thus keeping it in
perfect condition always. The following are net
cash prices, viz: 5 in., per joint, 12c; 6 in., per joint,
13c. Other sizes in proportion, and made to order
when desired. Packed 50 joints in a crate, for
which no charge is made.

SOLE MANUFACTURERS,

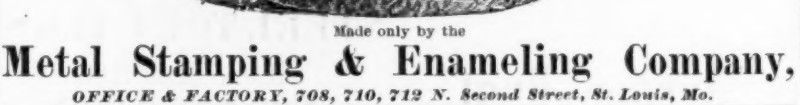
The Chicago Stamping Co.

Nos. 72, 74 and 76 Lake Street,
CHICAGO.

E. C. QUINBY, President. J. C. WHITING, Secretary.

ENAMELED IRON KITCHEN WARE.

(PATENTED.)



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ESTABLISHED IN 1848.

SINGER, NIMICK & CO.,

PITTSBURGH, PA.

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

STEEL.

Warranted Equal to any Produced.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives,

Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws,

Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement is unequalled for surface

finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.;

Cast and German Spring and Plow Steel.

"Iron Center" Cast Plow Steel. Finished Rolling Plow Coulters with Patent Screw

"Soft Steel Center" Cast Plow Steel. Hubs attached.

"Solid Soft Center" Cast Plow Steel. Agricultural Steel cut to any pattern desired.

Steel Forgings made to order.

Represented at 59 BECKMAN ST., NEW YORK, by

HOGAN & BURROWS Gen'l Agents for Eastern and New England States.

THE "CAY DECEIVER."

Best Catch-Alive Mouse Trap.



The Most Taking Novelty of the

Season.

BUY NO OTHER PATENT TRAP.

Per gross, cased, \$18.00; cases free.

Less quantity, \$2.00 per dozen.

Don't wait for our agents, but secure the

cream of the trade. First come first served.

Circulars free. Sample Trap, prepaid, 25c.

A handsome show card in each case of

Traps.

RIPLEY MFG. CO.,

Unionville, Conn., U. S. A.

E. OLIVER,

106 & 108 Beekman Street, New York.

MANUFACTURER OF

ROUND WIRE DISH COVERS,

Wire Cloth and Netting, Moulder Riddles, Decoy

Rat and Mouse Traps,

And all kinds of

Oyster & Steak Tin Wire Broilers, Meal & Flour Sieves.

PATENT DOMESTIC COFFEE POT,

Latest and best improvement in the market.

How Not to Start a Manufacturing Business.

A gentleman who claims to have had a quarter of a century experience in the iron business, makes the following sensible contribution to a St. Louis paper. After noting the generally depressed condition of manufacturing industries in the West, he explains it as follows:

The way a great many manufactures are started in St. Louis and elsewhere is this: A capitalist in his travels throughout the Eastern States sees manufacturers with fine establishments, doing a large business; it may be profitable, and may not; he gets the idea it would be a nice business to go into in St. Louis. He inquires the price of the raw material, cost of labor to work it up and finish the goods ready for sale. He then goes to a retail dealer, probably a friend of his, to know what he pays for such and such goods. His friend tells him the price (not always truthfully, for fear he would know how much profit he made). The capitalist then compares the cost (according to his figures) with what the retail dealer pays for it, and sees an enormous profit. He goes around among his friends, tells them he has struck a big bonanza, and proposes to get up a stock company, with a capital of say \$100,000; he has faith in it, and to show his faith takes \$25,000 or \$30,000 worth of stock; the balance is soon sold and the company is organized. Of course our capitalist is elected president. We must also have a general manager, secretary and treasurer. Of course the largest stockholders are elected to office, and some stockholders have friends that are just suited (in their estimation) for foremen in the different departments. The officers go on a tour of inspection to all works of the kind in the East; they see everything (or think they do), make notes of the same, and return home, fully satisfied that they are competent to plan the buildings and machinery and run the works. They conclude to have a first-class establishment, and let out contracts for large and expensive buildings. Of course they are going to do a big business and just coin money; their figures tell them so and figures won't lie. They next order their machinery, including a splendid engine—lots of bright polished work on it, &c. They put in all their machines, tools, &c., in the same extravagant manner, and think, now we are ready to start to manufacture goods for sale. We employ our foremen, say three, at \$5 per day, which is low; our foremen have friends out of employment, and they are set to work, although they have never seen works of the kind before; they employ a few men that have worked at the business, perhaps good mechanics, and now we make a start. But this machine, nor that machine, works as well as the machine we saw at Mr. So-and-so's in the East. Mr. President is positive the machines are the same in every particular as they have at Mr. So-and-so's. The trouble is with the man that is running it; discharge him and get a good man in his place. It does not occur to Mr. President that there was some very important point in the machine they had in the East that was not shown him, and which he did not have in his; and that little point being wanting, is the reason they cannot turn out their work the same as they do in the East. All their machines are the same; they drag along, changing this and changing that, and experimenting, in the hope of overcoming their trouble—all the time losing money. Then they have their first yearly meeting of the stockholders, to hear the reports read and see how big a dividend they are going to receive. After hearing the report their faces elongate. One remarks that the machinery is not right; when Mr. President tells him he knows nothing about it; another remarks we have not got the mechanics here they have in the East.

Another offers the following resolution: Resolved, That the president go East and engage the very best mechanic in that line as superintendent.

It is put to a vote and carried. That is one move in the right direction. Mr. President goes East and engages a really good man at a salary, say, \$3000 per annum; that is moderate enough. Mr. Superintendent also has friends that when he goes to a new place always go with him. He suggests to Mr. President that it would be a good idea to bring those men with him; Mr. President thinks so too. They are engaged at an advance on what they are receiving, and their fare paid to St. Louis. Mr. President returns and reports what he has done; Mr. Superintendent will be here in a month; he is a first-class man; we have first-class machinery, gotten up in better style than any in the East, and we will make money from this time on; our losses will be a thing of the past, soon to be forgotten. The superintendent and friends arrive; the company are pleased to see them, and introduce them around the works. They start up the following day; Mr. Superintendent and other officers tell the superintendent the trouble they have had with their hands; none of them knew what they were doing, and he had better discharge them and hire good men in their places. It does not take him long to see that the three foremen knew nothing about the business, and he discharges them. They go to the office and report what the superintendent has done. President goes to superintendent and tells him the foremen are relatives of some of the stockholders, and must be reinstated, which, of course, he has to do. The machinery, he discovers, is not constructed right; he tells the general manager he will have to shut down the works, remodel all the machinery before anything can be done; he tries to explain the little point that is deficient, and finds out that the general manager knows nothing practically of machinery. Superintendent goes to Mr. President hoping to be able to accomplish his object with him, namely, remodeling the machinery, when he is told that they are constructed precisely as they are where he came from. He takes Mr. President in to see the works, tries to explain where they are deficient, but he cannot see that that little thing would make any difference, which shows that Mr. President knows no more than his general manager or foremen. Mr. Superintendent persists in stopping and remodeling. Mr. P. tells him, no matter if

the machinery is right or wrong, they run it one year, and he must run it as it is, he will have no changes made, the stockholders were disgusted with their losses last year, and will put no more money into the concern. Mr. Superintendent is also disgusted; he left the situation in the East, where he has been for years, and where he could have been for years to come, and came to St. Louis to better his condition, and finds himself tied hand and foot; cannot get what he wants so as to run the works and make money; sees what fine chances there are for making money in the business, if he would be allowed to do as he would wish. He cannot go back, because his situation is filled by another. Finally concludes to remain here and make the best of it; he drags along in a makeshift way. The yearly meeting is held, report read, more money lost. Mr. P. wants to assess so much on each share of stock to enable him to run another year; tells them times are hard, that his competitors in the East run their manufactories cheaper than we can in St. Louis; that men turn out twice the quantity of work there to what the men do here, and labor is cheaper, in all of which he is mistaken. The stockholders want to know what has become of the money invested. They examine the books and find that—

	Per year.
Mr. President's salary is.....	\$3,000
Secretary and treasurer.....	3,000
General manager.....	3,000
Superintendent.....	3,000
Three foremen, each \$5 a day.....	4,500
Total.....	\$16,500

For walking bosses, and only one of them has any practical knowledge of the business. The balance of the officers are like the comet's tail, useless appendages.

The stockholders come to the conclusion not to pay in any more money. The officers have no money on hand to run the works, and they shut down and never start again. The stockholders conclude they have lost all they are going to lose, and will not advance money to pay notes falling due; they go to protest, and Mr. Sheriff winds up the business for them. And others will wonder why they failed; cause, no practical knowledge of the business, and seven non-producers drawing big salaries, and what under other circumstances would have been a grand success has proved a disastrous failure.

English vs. American Edge Tools.

The edge tool branch, says the Birmingham Daily Post, though not so buoyant as it has been, must still rank among the most active in the locality. Indian government contracts are well cleared off, and there is a lull in this department for the moment, but good orders are coming in for the West Indies, which are favorably influenced by the more settled condition of Cuba, and the Mexican and Venezuelan markets have also taken large quantities of agricultural tools lately. The Cape is a good customer, both for the old-fashioned Kaffir pick and for the more modern implements—spades and hoes—which are replacing them; but the Brazilian trade is, and has been for some months past, miserably bad, owing to the overstocking and unfavorable exchanges previously referred to. The home trade in edge tools continues dull. As to the prospects of the edge-tool branch there is no reason why it should not continue to flourish in spite of foreign competition, if manufacturers and men would work together in improving modes of production and keeping up quality, and so emulating the American makers, whose goods, as a rule, are lighter, handier and better finished than those turned out in this country. One of the greatest obstacles the English edge-tool trade has to contend with is the dishonesty of certain manufacturers, who send out thousands of dozens of hoes, spades, &c., made of iron only, without a particle of steel about them, yet branded and labeled "Warranted Cast Steel" or "Warranted Refined Cast Steel." These goods are not distinguishable in appearance from genuine steel tools, but their spurious character is soon apparent when they come to be used, and the result is to shake the confidence of buyers in all English-made goods of this character. "I can't trust English goods, even when they are marked cast steel," said a Cape buyer lately; they are as likely as not to double up the first day we use them; but if I can get a Yankee hoe I am safe." Some manufacturers, we believe, pay their men extra to stamp false marks on their goods. This is surely a matter of which our Chamber of Commerce ought to take cognizance, in the interests not only of our trade, but of our commercial reputation and of common honesty.

The cars for the Gilbert Elevated Road are in the course of construction at the Pullman Palace Car Works, at Detroit, Mich., and some of them are nearly completed. A description of them in the Detroit Free Press says that each car is 44 feet long and 8 feet 10 inches wide. At the eaves the ceiling is 6 feet 6 inches high, from which points a roof rises with a graceful curve from the sides and ends, until at a height of 7 feet 6 inches the central roof rises abruptly to 8 feet 6 inches. The platforms are large, and are covered by the projecting roofs and guarded by strong railings and gates. Each car has seating capacity for 64 people. The woodwork of the doors, seats and sides of the cars is of mahogany, and the ceiling is paneled with oak and mahogany. The seats are furnished with flexible backs of maroon morocco and spring bottoms, with cushions of morocco for winter use, and in summer are to be covered with woven rattan. The floors are to be covered with heavy Axminster rugs and carpets. The arrangements for heating and lighting are of the most modern description. Each car will rest on two 4-wheeled trucks, and will be supplied with the Eames patent brake. There are 60 of these cars contracted for by this company, of which 10 are expected to arrive at New York in a few weeks, and at equal intervals of 14 days to others will be sent, until the whole number shall arrive. Each car is to cost \$4000. The same company has also been awarded the contract for the woodwork of the cars for 20 locomotives for the Gilbert Road, which are being forwarded to the Grant Locomotive Works at Paterson, N. J., where the engines are being built.

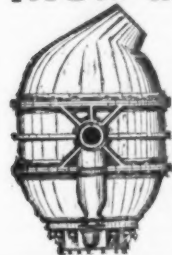
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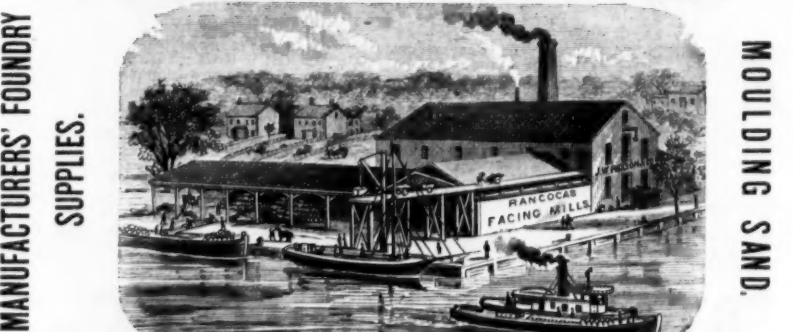
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The Founding of Alloys.*

BY EDWARD KIRK.

III. FUSIBILITY OF ALLOYS.

In forming alloys of the different metals they do not combine with each other in their solid state (with the exception of mercury), owing to their chemical affinity being counteracted by the force of cohesion; and in order to form combinations of them it is necessary to liquify at least one of them, in which case they will unite, provided they have a chemical affinity for each other; thus bell metal and brass is formed when pieces of tin or zinc are put into molten copper; and in the formation of alloys of this nature, where one of the metals are more fusible than the other, the less fusible metal should be fused first and the more fusible metals added either in the molten or solid state. As the fusible metals are added the temperature of the alloy should be reduced to prevent oxidation or burning away of the fusible metals; for this reason it is better to add the more fusible metals in the solid state, as by so doing the temperature of the metals is decreased. Alloys are always more fusible than the less fusible metals of which they are composed, and in some cases are more fusible than the most fusible metal they contain, as is the case in alloys of tin, lead and bismuth. Some foundries, in order to have the metal thoroughly united, first fuse the metals together and cast them into ingots and remelt them for use; this practice is bad, for in the after-fusion there is always more or less of the more fusible metal burnt away, and it is hard to determine the proportions of the alloy or to have any certainty as to the quality of the castings. In melting ingots or scrap alloys they should be fused as rapidly as possible, and at the lowest available temperature, so as to avoid oxidation.

Some of the metals are almost infusible, and when heated to the highest heat in a crucible they refuse to melt and become fluid; but any of the metals can be melted by combination with the more fusible metals; thus platinum, which is infusible with any ordinary heat, can be fused readily when combined with zinc, tin or arsenic; this metal, by combination with arsenic, is rendered so fluid that it may be cast into any desired shape, and the arsenic may then be evaporated by a mild heat, and leave the platinum, in its pure state, cast into any desired shape. Nickel, which barely fuses alone, will enter into combination with copper, forming German silver, an alloy that is more fusible than nickel and less fusible than copper; this alloy is rendered the whiter, harder and less fusible the more nickel is added. The less fusible metals, when fused in contact with the more fusible metals, seem to dissolve in the fusible metals; rather than melt the surface of the metal, is gradually washed down until the entire mass is dissolved or liquified and reduced to the state of alloys. In forming alloys of brass, in furnaces where heat enough cannot be obtained to fuse the copper separately, the alloy may be formed by heating the copper to the highest heat, and then adding the zinc or tin in the molten state, so as not to reduce the temperature of the copper.

In forming alloys with new metals it is usual to melt the less fusible metals first, and then add the more fusible metals and mix them by stirring them well together; the rod used in stirring them should be heated to redness to prevent lowering the temperature or chilling the metal. In mixing alloys for bells the alloy should be well stirred with an iron rod, well heated, in which case part of the iron is dissolved and combines with the alloy and gives the bell a better tone; but alloys of brass that are to be turned or finished should never be stirred with an iron rod, for the iron dissolved from the rod will cause hard specks in the alloy if not thoroughly mixed. In forming fine alloys the alloy should be stirred with a rod of the least fusible metal contained in the alloy, or with a wood stick; the wood stick, in many cases, is better than a metallic rod, for it causes the metal to boil slightly and unite more thoroughly, but the wood stick cannot be used in a small crucible with only a small amount of metal. When alloys are made that contain only a very small quantity of a metal that is difficult to fuse, as in pewter, it is scarcely possible to throw into the melted tin the half per cent of melted copper, with any certainty of the two metals being properly combined; and in forming this alloy it is customary to melt the copper in a crucible and then add to it two or three times its weight of melted tin; this dilutes the copper and makes an alloy, called temper or hardening. This alloy is very fusible and is melted in an iron ladle, and is added to molten tin or lead to give it the desired hardness and form pewter.

The metal mercury will bring about triple combinations of metals, even when the metals have no chemical affinity for each other, either when the metals are melted or in the solid state, as in water gilding, where the silver, copper or metal intended to be gilded is first made chemically clean by washing in acids and water, and then rubbed over with an amalgam of gold containing about 8 parts of mercury. This amalgam immediately attaches itself to the metal, and it is only necessary to evaporate the mercury, which only requires a very low heat, and the gold is left firmly attached to the metal, and it is only necessary to brighten it by burnishing. Water silvering is accomplished in the same way, and iron or copper and many other metals may be tinned in the same way. An amalgam of tin and mercury is made so as to be soft and easily crumbled. The metal to be tinned is cleaned in the same way as in gilding with gold or by turning or filing, and the amalgam is then rubbed on and the mercury evaporated by heat. This process of tinning is called cold-tinning. Other pieces of metal can be attached to a metal that has been tinned in this way, by soldering.

In the manufacture of tin plate the iron plate to be tinned is first scoured and made chemically clean. It is then immersed in a bath of pure molten tin, covered with resin and tallow to prevent oxidation. The iron plate remains in this bath for a short time, and the tin unites or becomes alloyed with

the surface of the plate, and comes out of the bath perfectly coated with tin, and is called tin plate. In this process the iron plate must be heated to the temperature of the molten tin before combination takes place. But by the aid of mercury the iron plate may be tinned at the atmospheric temperature.

BRASS FURNACES.

Furnaces for the melting of brass and similar alloys may be built of common brick and lined with fire-brick; but the best furnaces for this purpose are made with a boiler-plate caisson from 20 to 30 inches in diameter and 30 or 40 inches high. This caisson is usually set down in a pit, with the top of it only 10 or 12 inches above the foundry floor. The ash pit, or opening around the furnace, is covered with a loose wooden grating, which may be removed for taking out the ashes. The iron caisson is lined with fire-brick, the same as a cupola. The lining is usually 6 inches or more in thickness. The diameter of the furnace on the inside should not be more than 4 or 5 inches larger than the diameter of the crucible intended to be used in it; for if the furnace is too large more fuel and more time will be required to melt the metal. These furnaces are liable to burn out hollow around where the crucible sets, and to avoid a waste of fuel they should be straightened up with fire-clay and fire-sand, and always kept as near straight as possible. These furnaces are sometimes built square on the inside, but the square furnaces are not near so good and require more fuel than the round ones do. A good brass foundry usually has three or more of these furnaces. They are generally of different diameters to suit different sized

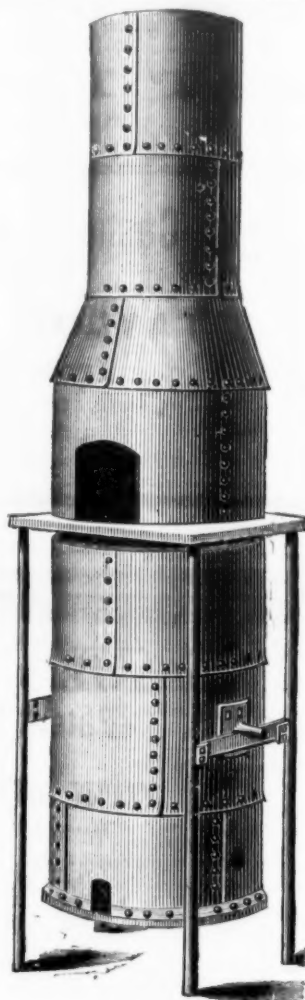


Fig. 16.

crucibles, and when it is desirable to make a large casting that requires more metal than can be melted in one crucible, two or more furnaces are used to melt the metal. But when more metal is required for a casting than can be melted in three or four crucibles, the metal is then melted in the reverberatory furnace, or in the common iron foundry cupola. When melting brass in a cupola the copper is usually charged and melted before charging the zinc or more fusible metals, and in some cases the zinc or tin is not put into the cupola at all, but is melted in an iron ladle and added to the copper after it has been drawn out of the cupola. When the amount of brass to be melted in a cupola is small, and the cupola has a good draft, the metal is usually melted without a blast; but when the metal amounts to several tons a blast is generally used. The swivel cupola (Fig. 16) is well adapted to the melting of brass, and is often used for that purpose. The common brass furnace usually depends upon a natural draft, and the furnace is connected with the stack by a small flue on the back side of the furnace, near the top. Three or more furnaces are usually connected with one stack, and each furnace is supplied with a separate damper for regulating the heat. When the stack is not high enough to give the furnace a good strong draft, the ash pit is closed up tight and a mild blast turned into the pit, for better melting can be done by turning the blast into the pit and allowing it to find its way up through the grates, than by putting the blast directly into the furnace by means of tuyeres.

These small brass furnaces are of easy construction, but as a temporary expedient almost any close fire may be used, including some of the common heating stoves, although it is much more convenient that the fire be open at the top, so that the contents of the crucible may be seen without removing it from the fire. Such stoves, however, radiate heat in a somewhat inconvenient manner, and to a much greater extent than the common brass furnace, which is lined with fire-brick or clay, and the lining concentrates the heat and economizes the fuel. The brass furnace is often used for melting iron in a crucible, and they answer equally as well for melting iron as for brass when the furnace has a good draft. Small amounts of brass are frequently melted in the ordinary black-

smith's fire, but there is considerable risk of cracking the crucible at the point exposed to the blast. A wrought-iron pot is sometimes used for melting small amounts of brass, but it is not very enduring, for the brass will soon cause it to burn into holes and leak. The fuel used in the brass furnace is generally hard coal or coke, which is broken into lumps about the size of hens' eggs for use. Either of these fuels will do good melting, but the coke will generate heat faster than the coal, and will do faster melting, which will prevent the oxidizing of the metal, and for this reason the coke is to be preferred when it can be obtained. Gas-house coke made from cannel coal is not fit for fuel in the brass furnace.

The fusible metals, or those not requiring a red heat, such as lead, tin, zinc, &c., are generally melted in a cast-iron ladle or pot. When the metals are melted in large quantities for small work, such as type-founding, the pot is usually set in brick-work, with a fire-place and ash-pit beneath it. In this pot the metal is kept in the molten state all the time, and dipped out with a small hand-ladle for use. When it is only desirable to melt a small quantity of metal, it is usually melted in the small hand-ladle, or in the ordinary plumber's pot over an open fire.

Steel Ships.—The long-continued depression in the coal and iron trades is beginning to attract attention to the possibility of constructing a greater number of steel ships. If the cost of steel were materially reduced the difficulties would cease. Practical men are now endeavoring to effect this object, and if successful a great impetus is likely to be given to this department of industry. Were it not for the war in the East the ship-building trade would experience a sharp revival. Ships are now laid up in dock for which no employment can be found, and many iron ships are in the market at from £8. 10/ to £9. 10/ per ton, while older vessels can be had some 20 per cent. cheaper. The number of ships of all nations reported as lost in 1877 was 2000, and as the majority of these belonged to Great Britain, some idea may be formed of the wear and tear of ships in years when trade is active and a larger quantity of tonnage can be employed than that afloat last year. Iron steamers and iron sailing ships are now so much in vogue that wooden vessels are rarely built except in the colonies. Nevertheless, wooden ships have proved in the long run very good investments, as was demonstrated a few years ago by the presence in the harbor of Ramsgate of a regular trader that had been built 60 years ago. New colonial ships can now be purchased at from £6 to £7 per ton, but very few second-hand ships of this class can be had for the lumber trade. The restoration of commercial enterprise will raise the value of this description of property, as timber carrying ships are becoming very scarce, and if there be an active demand freights will rise and the value of tonnage will increase in proportion.—*London Globe.*

From the Cincinnati *Enquirer* of the 15th we extract the following concerning the meeting of the creditors of Howell Gano & Co.: A meeting of the creditors of the hardware firm of Howell Gano & Co was held yesterday in Parlor A, Grand Hotel. About 75 creditors, representing some \$150,000 of the indebtedness of the firm, were present. The meeting was called to order about 11:30 a. m. by Mr. Howard Douglass, the attorney for the firm. Mr. A. H. Saxton, of New York, was elected chairman, and Colonel L. M. Dayton, of this city, was appointed secretary. Mr. W. P. Hulbert then moved that the meeting be a private one, and that all reporters be excluded. The motion was adopted, after which a committee of seven was appointed to examine the accounts of the firm, and report the amount to be paid, &c. The following gentlemen were appointed upon the committee: Messrs. A. H. Saxton, of New York; A. Britain, of Joliet, Ill.; J. L. Haven, of Cincinnati; J. S. Cole, of Wheeling, W. Va.; C. H. Wright, of New York; Samuel Dission, of Philadelphia, and Joseph Graff, of Pittsburgh. After the appointment of the committee the meeting adjourned until 4 p. m., when the committee reported, recommending a composition in bankruptcy and a settlement at 60 cents on the dollar, without interest; the average term for payments being one year, and payments to be made every three months. This report was adopted and the recommendation for a composition largely signed. It is but justice to Messrs. Howell Gano & Co. to state that the creditors present were well satisfied with the arrangements that were made, and expressed their willingness that the firm should go right on in its business.

Commercial Travelers and Drinking Customs.—The Montreal *Witness* says: A correspondent writing from a town in Ontario, in referring to the visits of commercial travelers, notices an improved state of affairs of late. Formerly the commercial travelers were the best friends the tavern keepers had; they not only as a general rule drank themselves, but they treated their customers at the bar in the most lavish manner. Nearly every transaction in former times was opened with a drink, and nearly every bargain was clinched with one. Now it is different. Our correspondent is inclined to attribute the cause of the change to the depression in trade; but this is not a main reason. The influence of Commercial Travelers' Associations has been brought to bear against this obnoxious habit of treating customers, and the commercial travelers of to-day are beginning to regard it as unbusiness-like and undignified.

The Prussian government offers a prize of \$80,000 to the inventor of a substance which is fit for the manufacture of casts from works of art. The substance required must flow into moulds easily without injuring them more than plaster does. The casts made must be able to undergo frequent cleansing without previous treatment. Applications, accompanied by samples in the crude and in the manufactured state, must be delivered to the Koenigl. preuss. Ministerium der Geistlichen, Unterrichts und Medicinal Angelegenheiten, before the 1st of December, 1878.

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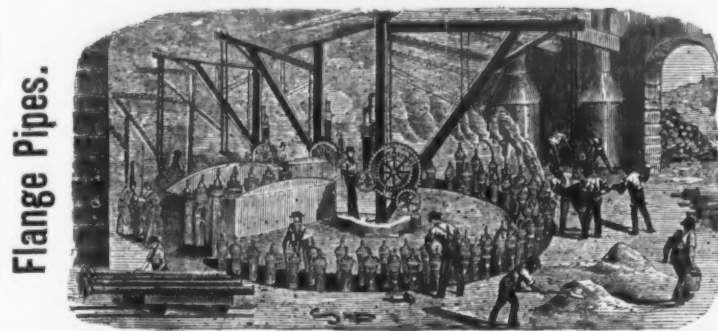
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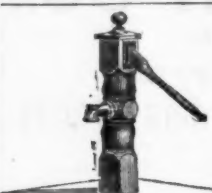
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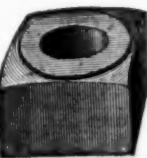
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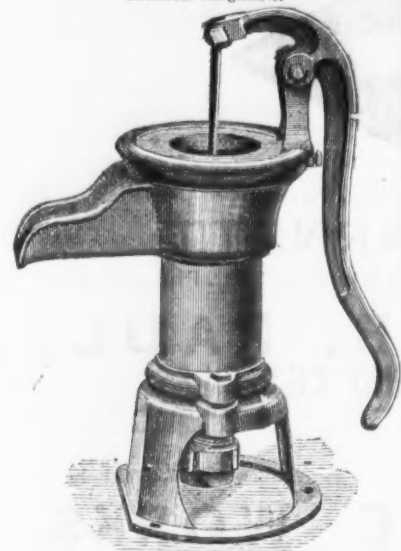
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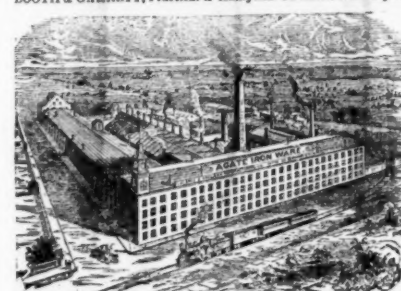


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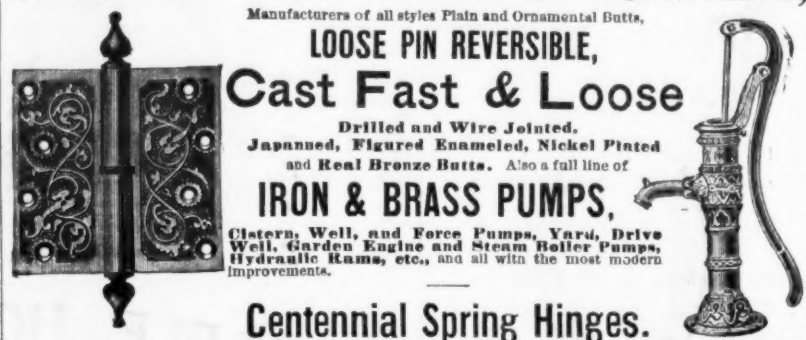
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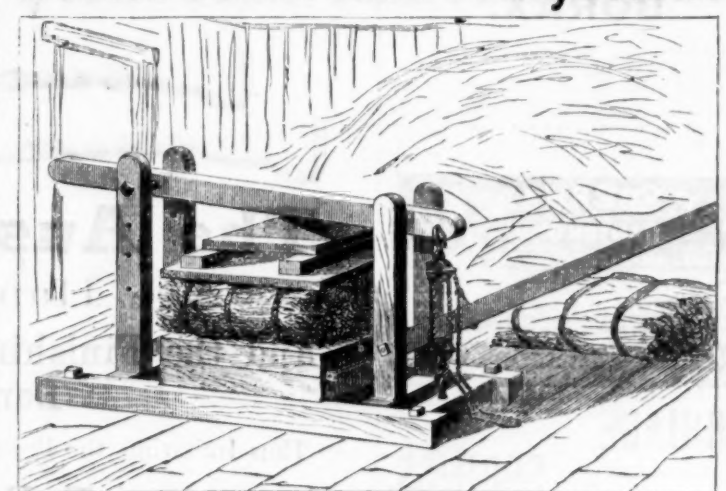
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by which great pressure can be obtained at the cost of but little labor. The
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One man can easily lift 1000 lbs. Load always suspended; it can
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How the Silver Dollars are Made.

The capacity of the various coining mints and assay offices in the United States will be fully tested during the coming year. The law of February 28, 1875, demands that between 2,000,000 and 4,000,000 of the new dollars shall be turned out every month. The officers of the mints think that 3,000,000 will be the maximum of production for the present, and to coin as many silver dollars as that a month will require brisk work at the mints. There will be, as a matter of course, no lack of silver in the mints to work upon. On the 11th of December last 11 tons of silver were sent to Philadelphia from the Assay Office in this city; 7 1/2 tons were sent on the 31st day of the same month, and at least 12 tons more have been sent during the last fortnight. Most of the silver received at the Philadelphia Mint passes through the New York Assay Office. There are two coining mints besides the one in Philadelphia—one in San Francisco and the other in Carson City; and assaying and refining are done in Helena, Montana; Boise City, Idaho; Denver, Colorado; and at a few other points in the far West. The Philadelphia Mint is capable of turning out about \$1,500,000 in coined money a month; the San Francisco mint, \$1,000,000, and the Carson City Mint, \$500,000. The mints cannot, of course, be given over exclusively to the coining of silver dollars. The subsidiary coins must be struck, and a certain amount of gold coinage goes on all the time. Gold is needed by the government to buy silver with, aside from all other purposes. It is coined mostly in the form of double eagles. During last month 21,210 double eagles were coined in Philadelphia, and 20 eagles, 20 half-eagles, 20 three-dollar pieces, 20 quarter-eagles and 20 one-dollar pieces were coined in the same time. The other coining of the Philadelphia mint during February comprised 200 trade dollars, 375,000 half-dollars, 1,461,800 quarter-dollars, 200 twenty-cent pieces, 964,200 dimes, 600 five-cent pieces, 600 three-cent pieces and 910,800 cents.

Silver is sent from the Assay Office to the Philadelphia Mint pure, or 999 fine, which is about as pure as can be. It is sent in large bars, and, when received at the mint, is melted and alloyed with copper. Coin silver is 900 fine. After being melted and alloyed, the metal is cast into ingots, which are simply bars of a convenient size for handling. The metal is then assayed to determine whether it is exactly of the standard fineness. Assaying is done by what is known as the dry or humid process. Samples for assay are taken while the silver is in a fused condition, and two assays are made of every specimen. The silver ingots then go to the coiner. They are first rolled into strips, and as the rolling process is apt to make the metal brittle, it is annealed to soften it. Silver is annealed simply by heating in an open wood fire, and then being allowed to cool gradually. The silver dollar strips are passed through the rolls 9 or 10 times before the first annealing and 4 or 5 times afterward. Then the process of annealing is repeated. After the last annealing the strips are run through cutters which divide them into drafts of the proper thickness for the coins; and these in their turn are run through a steam punching machine which cuts planchets the proper size for the coin. From 150 to 240 are cut in a minute. As the metal gets greasy during this process, the planchets are then dipped into a bath of diluted sulphuric acid, which is too weak to act upon the surface, but effectively removes all foreign matter. The planchets are then adjusted; that is to say, they are carefully weighed, and all that are lacking in weight are cast aside; such pieces are called "lights," and the "heavies" are the pieces which weigh too much and are filed off. The adjusting is done by women. It is a process which requires much delicacy, and scales are used which are sensitive to one sixty-fourth of a grain. After the adjusting is finished, the next operation is the milling, which is done with a curious sort of machine. The edges of the coin are thrown up and grooved by this process. After another cleaning with sulphuric acid the coins are ready for the die. The stamping is done on a screw press, and both sides of the coin are stamped at the same time. The dies are cylindrical blocks of steel, upon which are carved the designs to be transferred by pressure to the coins. Art of a high order, as well as fine mechanism, is conspicuous in this part of the coining process. The designer, in the case of the new silver dollar, Mr. Morgan, first draws his design on paper, from which is made a model in wax of which a plaster cast is taken, and from this cast an electrotyp is taken, upon which careful revision is made with the graver. This electrotyp, like the model and cast which preceded it, is three or four times larger than the impression which appears on the dollar. The design is transferred to a steel die by using Hill's reducing machine, constructed on the principle of the pantograph. One arm of this instrument, with a blunt point, follows the lines on the electrotyp, while the other arm, to which is attached a strong and rapidly revolving drill, reproduces the same lines on a smaller scale upon a steel block. By means of a press this impression is transferred to another block in intaglio and thence upon another block, which is the parent die. After each transfer the lines are carefully improved with a graver. Steel of the same quality as that of which the parent die is made is used for the coining dies. They are annealed and tried on both ends. Two or three blows in the screw press, which is worked with a large wheel, secures a perfect impression, and both the obverse and the reverse of a coin are struck at once. Machinery places the planchets between the dies, and afterwards drops the completed coin in a box. Two or three pieces of each coinage are reserved for the annual government assay.

The process of melting, refining and assaying gold and silver are carried on in the Assay Office, in this city, on quite as large a scale as at the Philadelphia Mint. Not only government work is done here, but large deposits are made daily of gold and silver bullion by private individuals. Gold is always found alloyed with silver, and it is never found with any other alloy. To separate the silver from the gold, the bullion is boiled in sulphuric acid, which removes the alloy; the gold is then reboiled and reduced to a coarse powder resembling clay. Its purity then is 998 or 999. The silver, mixed with copper, is run into vats on a lower floor, and is purified and granulated, when it resembles pipe-clay. The granulated gold and silver are pressed into large cheeses in a hydraulic press. A cheese of gold, 12 inches in diameter and 3 inches thick, is worth \$20,000; a silver cheese of the same size is worth \$900. The vitriol and the weak acid are both sold for as much money as the original acid costs. The substitution of sulphuric acid for nitric has caused a saving to the New York Assay Office alone of \$100,000 a year. Depositors receive their gold and silver separately at standard purity, 900. Pure metal is also sent to the Assay Office from the various refineries to be alloyed. From United States refineries silver is generally sent in large bars or cakes, and a small amount of Mexican metal is received in thin, irregular-shaped pieces called disks. The fumes from the vats and furnaces in the Assay Office are condensed and sold as weak acid. Only a small amount of the gas escapes into the atmosphere, and although it is slightly offensive, it is not injurious. On the contrary, this gas is an excellent disinfectant, and acts upon dead matter rather than living. The same precautions are taken to prevent loss in the Assay Office as in the great mints. The ashes, the sweepings from the floor, the crucibles and all the instruments which come in contact with the precious metals are washed and ground in a machine constructed for the purpose, and the stray particles of silver and gold are gathered together.

Construction of Annealing Furnaces.

For the annealing of iron plates, Messrs. E. James & S. Thomas, of Bilston, propose to construct furnaces (suitable for open or close annealing) with more or less horizontal flues running the whole length of the annealing oven or furnace underneath the siege or bottom of the furnace, and in connection with these flues they form at suitable intervals in each horizontal flue vertical openings or upcast flues coming through the before-mentioned sieges or bottom of furnace. The flame or heat rushes through the said horizontal flues, and is then brought over and through a perforated bridge at that end of the annealing oven or furnace in which the box or boxes containing the articles to be annealed are placed; and on its way back over the top of the box or boxes and the said siege or bottom of the furnace, the smoke and spent portion of the flame or heat is met on its way or exit to the stack (the draft of which is regulated in the ordinary way by a damper) by the hot air and flames arising from the before-mentioned vertical openings or upcast flues, which may be of any suitable number, thus burning and destroying all the smoke and gases generated, and by this means obtaining complete and perfect combustion. At the before-mentioned bridge end of the oven or furnace over which the flame or heat passes they place suitable airways or openings, through which (if necessary) they can admit a supply of air, thus further assisting the complete combustion and great economy of the fuel. Furnaces thus constructed, with the flame or heat conducted through suitable flues running under the whole length of the siege or bottom of the furnace, and also back again over the same, impart a thoroughly uniform heat, caused by the heat or flame passing under, over, and around the box or boxes containing the articles to be annealed, thereby affording greater facilities for the uniform expansion and contraction of the metal forming the box or boxes than are obtained by the use of any other annealing oven or furnace in general use, and thus greatly diminishing the amount of breakage and destruction of the boxes used, and the consequent imperfect annealing of their contents. The boxes therefore subjected to this uniform heat last much longer, and the contents, especially if they be thin gauge metal sheets or plates intended for tinning, galvanizing, or otherwise, are rendered thoroughly annealed and pliable, and have at the same time a highly smooth surface imparted to them, which is in itself a very great desideratum in the working up of such metal sheets into manufactured articles.

Nailers' Consumption.—A correspondent writes us that nothing is so common among nailers of late years as what is known as nailers' consumption. The rate of mortality from diseases of the lungs, superinduced by the dust from the grindstones, is positively fearful. A post-mortem examination, held on the body of G. W. Johnson, of Wheeling, who died a short time ago, which was published in the daily papers, furnished a full description of this so-called "nailers' consumption." An attempt has been made in some of the nail manufacturing factories to prevent dust from circulating by introducing powerful fans, with a series of pipes by which the dust is carried off through the fans by exhaustion. Now this is all well enough, so far as it goes, but the fans do not, nor is it possible for any known mechanical appliances to remove all the dust; hence sufficient dust remains floating in the atmosphere to kill in a short time persons whose respiratory organs are not of the most healthy and durable character. Most particularly is this the case with nailers. Devices, such as a moist sponge worn over the nose and mouth, fail to prevent the complaint. Our correspondent recommends a fist mustache so constructed that it would fit neatly around the outer rim of the nose, extending down below the chin on those who have no beard, or correspondingly to those who have. A light gum elastic string would hold it on without disagreeable feeling. Any hair not too coarse would answer the purpose. Such an appliance would not disfigure the face when worn, could be easily adjusted, and would save many a poor fellow from an untimely grave. If any one will take the trouble to look at a hair under a microscope, he will see how nature has constructed it for this purpose. A feather is a very good illustration of a hair, with its thousands of barbs all pointing the same way, catching and holding all floating particles that are drawn toward the nostrils by inhalation.



USE THE BEST.

NEW



THE NEW AMERICAN FILE COMPANY have the exclusive right to use the Bernot process for cutting Files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing Files and Steel.

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AUBURN FILE WORKS,
Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
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Highest Premium.



Steam and Frost prevented on Show Windows.



REVOLVING VENTILATORS

For everything (and every size), from a hat or cap to an exhibition building. Kitchens, Laundries, &c., ventilated without draft. Durable, strong, without rivets or solder. Oiled for six months. Each one has storm cap. Retail price, size six inch diameter, \$1.00 and upwards; apparatus with which any one can cut circles in glass, 15 cents each.

Protective Ventilators avoid drafts, exclude dust, dampness, malaria and germs of disease; adopted by hospitals, schools, institutions, &c., applied to any window or room. Prof. A. L. Loomis, M. D., University of City of New York, writes as follows: "From my personal experience and that of my patients who have used your Ventilator during the past six months, I am convinced that your method of removing dust, impurities and dampness from the atmosphere is the best which has yet been proposed. By it the air in an apartment can be constantly changed without causing drafts. I would especially recommend its adoption in sick rooms, sleeping apartments, nurseries and school rooms."

Air Filters and Moisteners, placed over hot-air registers of furnaces, &c., prevent dust and supply steam filtered air. Prices and discounts to the trade sent on application.

The "Economy" Molding Weather Strip is perfect in every respect. By enlarging edge of rubber or felt, and making slot in molding to correspond (see engraving), we save all other expense of molding. Once purchased it will last a lifetime, because rubber, etc., has only to be removed by taking old piece out of either end of molding, and sliding in a new piece. By this method of securing rubber all uncertainty of fastening or undoing of glue or tacks is overcome.

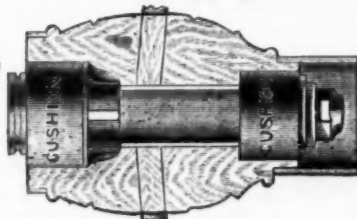
Rubber supplied with enlarged edge and instructions to enable Car Manufacturers, Carpenters, Builders and far off trade to make slots in Sashes, Doors, Moldings, &c., and thus make perfect Weather Strips.

No. 6.



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Assures in its Use

SAFETY, COMFORT and ECONOMY.

Vibration, Jolting, Pounding and Noise largely decreased, reducing Wear and Tear to a minimum. Approved and endorsed wherever used. Correspondence solicited.

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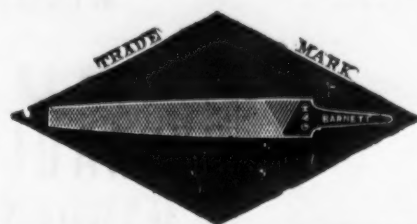
Warehouses,

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To the Hardware Trade.—GENTS: We desire to call your attention to our brand of HAND-CUT FILES. The files we offer are of equal quality, and made by the same process as those manufactured by Stubbs, Butler, Spencers and others, of Sheffield, England, and we shall so continue to manufacture them until we become satisfied that the American Market demands an inferior file at a lower price, which can only be produced by



the introduction of machinery for cutting, which, to this time, we have not thought advisable to introduce in our works, as our files have been tested by the largest and most experienced consumers, who have decided the great superiority of HAND-CUT over Machine-Cut Files, and advise us to continue the original process of CUTTING BY HAND as the only method of producing a first-class and strictly reliable article.

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FILES AND RASPS
Made from Best ENGLISH CAST STEEL. Quality guaranteed by written warranty when required.

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Manufacturers of SUPERIOR HAND CUT

FILES & RASPS,

HAND-CUT. Manufactured by
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Every File warranted.
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HELLER & BROS.
We invite the attention of the trade to our Celebrated American Horse Rasps & Files, made from the very best American Steel, all cut by hand, and warranted to give entire satisfaction. All Rasps & Files not stamped as the annexed incorporated trade mark are not genuine. Sold by Hardware Dealers generally.



Government Standard, Hot Forged
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HORSE SHOE NAILS.

Made from the best of Norway Iron, and warranted never to splinter or shiver in driving.

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We have also on hand a general assortment of Hardware.

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Concentrated Borax in sacks.
Selected concentrated Borax in barrels.
Refined Borax in cases.
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PRACTICAL MAKERS OF PLAIN AND ORNAMENTAL
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JOHN H. REOCK, PASSAIC SPRING WORKS.
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AUSABLE HORSE NAILS
POLISHED OR BLUED.
HAMMERED AND FINISHED



The Ausable Nails

Are Hammered Hot,

And the Finishing and Pointing are
Done Cold,

Thus Imitating the Process of Making Nails by Hand.

Quality is **Fully Guaranteed.**

For Sale by all Leading Iron and Hardware Houses.

ABRAHAM BUSSING, Secretary,
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Bolt and Rivet Clippers,

For cutting off the ends of bolts and rivets, on carriages, wagons, harness, &c.

SEND FOR A CIRCULAR AND PRICE LIST.

Liberal discount to the trade.

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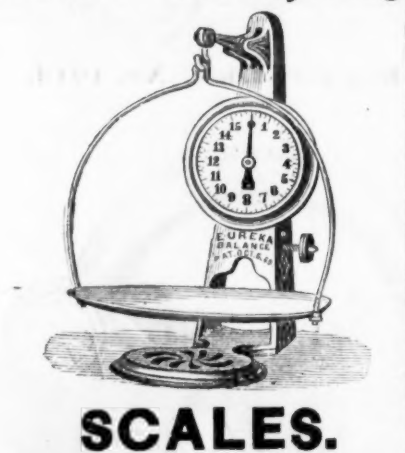
TACKS OF ALL KINDS.

Shoe Nails, Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.

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MANUFACTURED BY
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Has a patented attachment for ascertaining the tare of a dish or other receptacle used in weighing without the use of weights or loss of time. Manufactured only by

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Manufacturers of

MEASURING TAPES.
Of Cotton Linen and Steel.
For all purposes for which Tape Measures are required. Only manufacturers of

Paine's Patent U. S. Standard Steel Measuring Tapes,
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FINE TEMPERED STEEL SPRINGS, FINE TEMPERED STEEL BAND SAWS, From 1/4 inch wide upward. Warranted tougher than any other Band Saws. Catalogue on application

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Noiseless Self-Coiling Revolving **STEEL SHUTTERS,**
FIRE AND BURGLAR PROOF.
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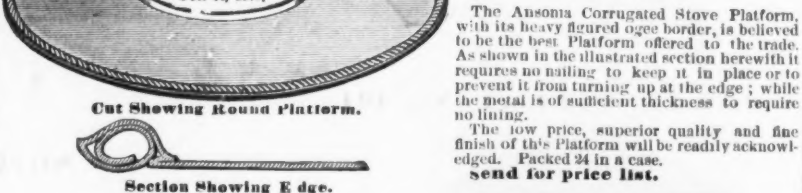
Rolling Wood Shutters

Of various kinds. Clark's Shutters are the best and cheapest in the world. Are fitted to new Tribune Building, Lenox Library, Delaware and Hudson Canal Co.'s Building, Transatlantic Steamship Co.'s new Dock, American News Office, &c., Posey County Court House, Mt. Vernon, Holt County Court, Oregon, Mo. Also to buildings in Boston, Cincinnati, Detroit, Janesville, Wis., Baltimore, Canada, &c. Have been for years in daily use in every principal city throughout Europe, and are endorsed by the Leading Architects of the World.

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ANSONIA CORRUGATED STOVE PLATFORM

Manufactured by the
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The Ansonia Corrugated Stove Platform, with its heavy figured edge border, is believed to be the best Platform offered to the trade. As shown in the illustrated section herewith it requires no nailing to keep it in place or to prevent it from turning up at the edge; while the metal is of sufficient thickness to require no nailing.
The low price, superior quality and fine finish of this Platform will be readily acknowledged. Packed 24 in a case.
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Bronzed Fire Screen,
With Ornamented Mouldings.
PATENT APPLIED FOR.
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A General assortment of
HARDWARE
For the country trade constantly on hand.
JOHN L. BROWER & SON, 288 Greenwich Street, New York.
JOWETT'S HORSE RASPS, 14, 15 and 16 IN.
Agents for Maharaj's No. 1 Fire Shrinker, Heller's Rasps, Clark's New Pat. Sash Fasteners. Send for Circular.

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We desire to call special attention to our New JOINERS' POCKET BLOCK PLANE. We believe this tool when once seen will speak for itself more pointedly than anything we could possibly say. It is simplicity itself, both in construction and operation, and the nicest working tool ever made, and specially recommended for amateurs, pattern makers, light scroll saw work, etc., etc.

No. 12, 4 1/2 in. in length, 1 1/4 in. cutter, Japan'd finish, polished trimmings. each. 50c. doz. \$5.00
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Sent by mail, postage paid, on receipt of price.
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Manufactured by
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Providence, Rhode Island,
MANUFACTURERS OF

United States Standard Rules,

AMES' UNIVERSAL SQUARES,
Patent Hardened Cast Steel Try Squares.

THE AMERICAN STANDARD WIRE GAUGE,

Bevel Protractors, Hardened T Squares and Bevels, Center Gauges, Steel German Silver and Boxwood Triangular Scales, Venier Calipers,

Caliper Squares and Rules, Plumb Bobs,
Paper Drawing Scales, Willis' Odontographs, Steel Straight Edges

and T Square Blades.

MEDALS AWARDED: Paris Exposition, 1867; Vienna Exposition, 1873; Philadelphia, 1876.
Illustrated Catalogue sent per mail on application.

The Fort Pitt Boiler Works.

The Chicago Journal of Commerce says: The firm of D. W. C. Carroll & Co., established in this city in 1843, have gradually added various lines to their business of boiler making until they are now fully prepared to execute almost any kind of work, and have succeeded in establishing a large business in the line of tanks of all kinds. We believe this firm constructed the first iron oil tank made in Pennsylvania. This tank was made of 5-16 plate and held 5000 barrels. To build such a tank was by many iron workers thought to be impracticable; but this industry has now developed until it is not an uncommon occurrence with them to build tanks holding 25,000 barrels. Another branch of ironwork which this firm are successfully carrying on is the building of iron frame roofs, used more generally for depots and bridge building, and are coming into quite general use for rolling mills, furnaces, all large buildings and, finally, probably the latest iron industry which has been developed, iron boat-building. Messrs. Carroll & Co. are doing a large business in this line. They built the boat G. W. R. Bailey for Capt. James B. Eads, which he used in dredging the mouth of the Mississippi River through the jetties. This boat was building when the boiler works were burned. Temporary buildings and machinery were put up on the river bank, and the work progressed without interruption, and the vessel began in April was completed early in the fall of last year, this company doing all the ironwork, including boilers, engine and all that pertains to rigging an iron boat complete. A very interesting work which we witnessed in these shops was the riveting of a large boiler by the use of a machine punch operated by steam, which did its work rapidly and better than by hand. We found the works running almost to their fullest capacity. There was one order for 150 farm boilers being rapidly disposed of, besides a score of other large boilers and fire-boxes; an iron roof for a Pennsylvania railroad building had just been completed. We need scarcely add that Messrs. Carroll & Co. have secured their extended trade by attention to business and thorough workmanship in every instance.

On Boiler Incrustations.

The inconvenience arising from boiler incrustations is well known, and although there are a great number of preventives, many manufacturers prefer rather to have the scale picked from their boilers than to adopt means of counteracting its formation, a fact which can only be attributed either to negligence or unfavorable experience with one of the numerous infallible specifics recommended to them. The principles upon which the action of these preventives is based are too insufficiently known, and many false ideas still adhered to must be dispelled before an intelligent appreciation of the various modes in use or suggested is possible. A comparison of the analyses made of various scales will show that the same substance does not predominate in all cases, so that four classes may be distinguished, of which the following may serve as examples:

First Class.—Sulphate of lime predominating substance.

	I.	II.	III.
Anhydrous sulphate of lime	48.00	62.88	76.70
Carbonate of lime	44.25	14.05	8.30
Anhydrous magnesia	0.82	6.69	2.64
Oxide of iron and alumina	2.24	5.28	1.82
Silica	0.47	trace	0.68
Combined water	3.68	7.90	3.45
Insoluble matter	0.48	2.25	5.65
Total	99.94	99.65	99.35
Specific gravity	2.703	—	2.748

The scale of No. 1 was taken from a Field boiler fed with well water, the deposit being 0.08 inch thick, very hard and black. No. 3 came from a boiler fed with river water previously heated. It was 1.60 inch thick, black and very hard.

The following is the analysis of a scale belonging to this class, which came from the boiler of an ocean steamship:

Sulphate of lime	77.42
Hydrated magnesia	24.24
Chlorine, fluoride, silica, phosphoric acid, alumina, oxide of iron, &c.	3.34
Total	100.00

Second Class.—Predominating substance, carbonate of lime. Analysis of the scale of a portable engine boiler:

Carbonate of lime	96.8
Water, organic matter, traces of magnesia and sulphuric acid	3.2
Total	100.00

	I.	II.	III.
Carbonate of lime	84.1	66.9	55.05
Magnesia	8.4	9.3	4.95
Oxide of iron and alumina	4.6	3.6	2.10
Insoluble matter	11.5	9.7	2.46
Organic matter	5.4	3.6	—
Water and carbonic acid with magnesia	6.3	6.9	—
Anhydrous sulphate of lime	—	—	31.94
Combined water	—	—	2.31
Total	100.00	100.00	96.36

The third analysis being made of scale fed with water to which soda had been added in insufficient quantity.

Third Class.—Predominating substance, hydrate of lime. Analysis of a crust 15 to 20 inches thick from a boiler fed with water which had been previously purified by Haen's process:

Hydrate of lime	70.45
Caustic lime	14.58
Hydrate of magnesia	4.32
Carbonate of lime	6.00
Oxide of iron and alumina	0.80
Silica	1.29
Insoluble matter	2.22
Total	99.66

Fourth Class.—Predominating substance, fats and fatty acids.

	I.	II.
Fatty acid and fat	75.2	77.7
Lime	8.4	7.49
Magnesia	0.63	—
Oxide of iron	1.6	1.58
Silica	1.8	0.07
Water	10.8	12.50
Total	100.0	99.91

The first analysis was made of a spongy scale, having a specific gravity of 1.145; the second, of an incrustation from a boiler, the sides of which had been coated with a mixture of green, graphite and charcoal powder. An examination of these analyses will show that when the water has not been

purified previous to use, the incrustation will consist chiefly of sulphate and carbonate of lime, and that when fatty substances are introduced into the boiler, either purposely or by the water from condensers, a solid mass may be formed which does not, however, generally give rise to the inconvenience which scale of the two first classes possess. Scale chiefly composed of hydrate of lime is formed only when the feed water has been but imperfectly treated by Haen's process, which is otherwise excellent.

Evidently the substances which have been proved to be present in the scale must have been in some manner produced in adhering layers. A superficial examination of the question might occasion the belief that the deposit is due to the concentration of the water in the boiler, so that a part of the matter in solution must be precipitated. This is only partly true, because there is another more important cause which affects the formation of scale.

In order to arrive at correct conclusions it is necessary to consider separately every substance entering into the composition of the scale.

Let us commence with the sulphate of lime. It is well known that this salt in combination with water forms gypsum, which when powdered, heated and then stirred with water forms a solid mass. Sulphate of lime is met with in many natural waters, the following table indicating in what amounts

1,000,000 parts of water from—	
The Rhine at Arnhem contain—	parts 20
The Meuse at Grave	6
A pump at Flessingen	250
Leyden	83
the Hague	93
Utrecht	60

Gypsum is but little soluble in pure water (1 in 400 parts). It is one of the small number of salts whose solubility decreases with a rise in the temperature of the water. Fresenius states that at 53° F. 1000 parts dissolve 2.33 parts of it, while it sinks to 2.17 parts at 212° F. This difference of solubility is, however, greatly increased whenever chloride of sodium—ordinary salt—is present, as the following table, which embodies the results of Mr. Cousté's experiments on this subject, will prove:

1000 parts sea water will dissolve—	Degrees F.
5 parts sulphate of lime at—	217
4.3	223
3.5	233
2.7	240
2.3	245
1.8	250
1.4	255
1.0	259
0.6	266
0.2	272

We see, therefore, that when the boilers of an ocean steamer are fed with sea water, sulphate of lime is deposited not only in consequence of the evaporation of water, but chiefly because an increase of temperature diminishes the solubility of the sulphate of lime.

Carbonate of lime behaves in quite a different manner. In pure water free from carbonic acid it is almost insoluble, 30,000 parts being necessary to dissolve one part of carbonate of lime, but if the water is saturated with carbonic acid, 1140 parts only are required. If water thus charged with carbonate of lime through the agency of carbonic acid is boiled, the latter is expelled and almost the entire amount of the carbonate of lime is precipitated. Therefore well water, which generally contains carbonic acid, is apt to give rise to such scale. When the precipitation is rapid, a gray or yellow powder is produced, but when it is gradual, adhesive layers are most probably formed. Formerly it was held that scale incrustations were due solely to the presence of crystallized gypsum, which mechanically inclosed the particles of carbonate of lime; but one of the analyses given and the hard deposits of the Carlsbad springs holding 93.6 per cent. of carbonate of lime, prove this supposition to be incorrect. Alefeld explains the formation of hard adhesive masses of carbonate of lime in the following manner: The substance is precipitated as a powder, which cannot settle while the ebullition during the working period of the boiler keeps it suspended. It is deposited during the night when the boiler is not worked, and when the fires are lit in the morning the influence of the heat forms a compact mass. It is a fact that often small pieces of detached carbonate of lime have been found to unite, especially above the fire-place.

A Supplementary Contract for the Poughkeepsie Bridge.—We have already announced in these columns, on the authority of the chief engineer of the Poughkeepsie Bridge Company, that work on that great structure is about to be resumed. A temporary stoppage of the work took place several months ago on account of differences arising between that company and the contractors, known as the American Bridge Company. It is satisfactory to know that within a few days these have been adjusted by a supplemental contract executed in this city, so that now all is harmonious, not only as between the respective companies, but a number of men who have been waiting for their pay will soon get their dues. The action just taken was made necessary in consequence of increased expense in carrying the foundations deeper than was originally contemplated.

Self-sharpening Plow Share or Point.

—A very simple but effective improvement has been brought out by the New York Plow Company, consisting of nothing more than a reversible steel point, which can be detached or replaced by another, when worn out, a common nail being used as a peg. These shares being always sharp do not require the hollow or dip which is necessary in the solid shares in order to make them penetrate when dull, and which not only requires more power, but more labor to hold the plow; at first, to keep it from running in, and when dull, to keep it from running out. These shares also preserve the wing as the plow runs level, and the wing wears sharp instead of growing thick and dull, as they must do in all plows that do not run level. Where the plowman uses the precaution to wear one side of several slips before turning any of them, and thus preserves the correct lines, the wing of the share has a cutting edge as sharp as if ground on a grindstone.

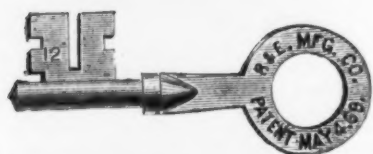
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Manufacturers of HARDWARE.

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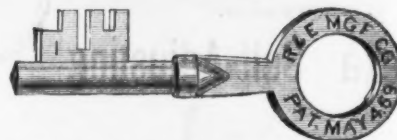
WAREHOUSES: NEW YORK, 45 & 47 Chambers Street; PHILADELPHIA, 425 Market Street; BALTIMORE, MD., WM. H. COLE. Agent, 17 South Charles Street.



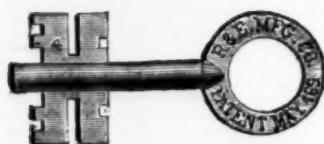
Steel Key Pad Lock, No. 1219.



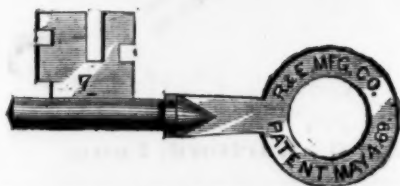
Flat Steel Key Pad Lock, No. 421.



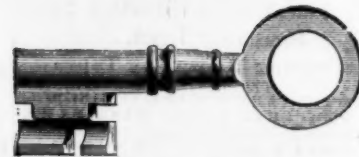
Steel Key Pad Lock, No. 1213.



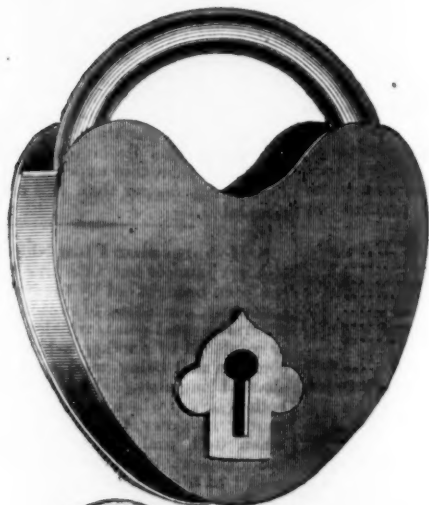
Steel Key Pad Lock, No. 1220.



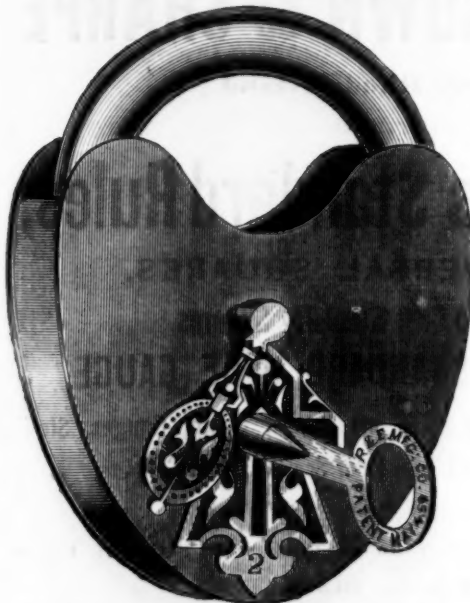
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Cutlery.

Cutlery.

A New Monkey Wrench.

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Manufacturers of **PEN AND POCKET CUTLERY.**
Solid Steel Scissors, Shears, Razors,
Russia Leather Strops, Hones, &c.
Sole proprietors of the renowned full concave patent
"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
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Agents for the **BENGALL RAZORS.**
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The "PATENT IVORY" HANDLE TABLE KNIFE.
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CELLULOID
HANDLE FOR TABLE CUTLERY. A most beautiful and perfect substitute for Ivory. Also makers
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GARDNER'S PATENT
AMERICAN TABLE
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PATENT TRIANGULAR HANDLE SCREW DRIVER.
This Triangular Head fits naturally to the grasp of the hand, and affords to the user the strongest possible
grip, as any one can satisfy himself by trial. Three turns of the wrist—the part of the arm above the elbow
remaining stationary—make one complete circle, so that a single twist of the wrist just suffices to shift the
grasp from point to point.
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Electro Plated Ware, German Silver and Britannia Spoons.
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THE FRARY CUTLERY COMPANY,
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Manufacturers of all kinds of Table Cutlery.
FRARY CUTLERY CO. PAT. JULY 4. 18. OCT. 10. 1876
FRARY CUTLERY CO. PAT. JULY 4. 18. OCT. 10. 1876
The above illustrations represent their New Patent Screw Tang Lock Fast Solid Handle Knife.
There is no question but that a solid handle Knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle
has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand
and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent
screw tang. A wood screw is welded to the tang of the Knife or Fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong
neat and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butchers and Carvers,
and furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly,
and very respectfully invite the attention of the trade.

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PLANE IRONS.
Gauges of all lengths and circles, beveled inside or outside. Nail sets, Scratch and Belt Awls, Chisel
Handles of all kinds. Orders filled promptly; generally same day as received.

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W. Clark's
Simple in action. Fleece evenly shorn without
injuring the skin. Is held firmly in right hand and
easily operated. Also
CLARK'S HORSE CLIPPERS.
No. 1 for two hands; No. 2, one hand, for heads
and manes; No. 3, one hand, for legs and coarse
hair; No. 4, for two hands, with improved spring.
Send for price list.
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SOLE AGENTS FOR THE
**GARDNER PATENT
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The assortment of Gardner's Celebrated
Barlow Knives has been increased, and they
are now furnished with Rubber, Bone, Stag
and Wrought Iron Handles.
All of Gardner's Patent Knives are fully warranted.

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AARON BURKINSHAW,
Manufacturer of Pen and Pocket Cutlery, Pepperell, Mass.
My Blades are forged by hand from the best Cast Steel, and warrant-
ed. To me was awarded the Gold Medal of the Conn. State Agricultural Society.

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"Limited."
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AGENT FOR
WALTER SPENCER & CO.,
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Corporate Mark.
No SPENCER
ROTHERHAM
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CELEBRATED CUTLERY,
No. 82 Chambers Street, New York.
F. & W. CLATWORTHY, Agents.
The demand for Joseph Rodgers & Sons'
productions having considerably increased, they
have, in order to meet it, greatly extended their
Manufacturing Premises and Steam power.
To distinguish Articles of Joseph Rodgers
& Sons' Manufacture, please to see that they bear
their Corporate Mark.
ESTABLISHED 1852.
NEW YORK KNIFE CO.
MANUFACTURERS OF SUPERIOR
Table & Pocket Cutlery,
WARRANTED TO BE MADE OF THE BEST
MATERIAL.
WALKILL RIVER WORKS,
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12 Warren St., N. Y., Importer of
Birmingham Heavy Hardware, Chains,
Anvils, Vises, &c.
Agency of HILL BROS. & CO., WALSALL, ENGLAND
GENERAL HARDWARE MERCHANTS,
And of
Ball's Pat. Solid Steel Sheep Shears.

This wrench, manufactured by Israel H. Johnson & Co., 442 N. Twelfth street, Phila-
delphia, is a representative of that class of
time-saving tools which are constantly be-
ing developed as a result of the necessarily
reduced cost of production during hard
times.
The novel feature of its construction is
apparent from a glance at the illustration.
Its general appearance is much the same as
ordinary forms, except that on the lower
end of the adjustable jaw, a number of
teeth (say eight or ten) are cut, which en-
gage in corresponding teeth on the stem of
the main jaw. Opposite to these teeth is a
spring attached to the sliding jaw, and hold-
ing the teeth in contact. There is play
enough at this point to ad-
mit of adjustment by pushing
against the spring, when the
teeth are thrown out of gear
and the jaw may be moved
by the thumb into the re-
quired position and then al-
lowed to drop in gear again.
This is all done by the thumb
in a moment, and is very
rapid and convenient. The
teeth have one-sixteenth of
an inch pitch, which affords a
sufficiently accurate adjust-
ment for all ordinary cases,
while the wrench possesses
the great advantage of re-
maining in whatever position
it is placed until intention-
ally moved to another. With
the wrench under considera-
tion the teeth are kept in
gear and hold the jaws firmly
in place, the greater the pres-
sure upon the wrench the
greater being the grip of the
teeth. It might be supposed that this ar-
rangement would be subject to rapid wear,
but it has been found in actual practice that
after months of constant, everyday use there
are no apparent signs of wear; it also pos-
sesses the advantage that in case of wear
the teeth of this wrench may be dressed up
with a file in a short time and with little
trouble. Only the teeth on the stem are
subjected to much wear, as they are case-
hardened forgings, the other jaw and teeth
being of hardened cast steel.
The makers have had many of them in
use in their own works, and state that their
men will not now use any other. They are
furnished in three sizes, and with either
bright or black finish.

**Agricultural Implement Trade in
Germany.**—We have the following letter
from the German committee on an inter-
national market for agricultural machines
and implements:
HAMBURG, 1878.
The committee for the international mar-
ket for agricultural machines and im-
plements (which is to be held in this city from
the 13th to the 17th of June, of this year) are
endeavoring to procure for manufacturers
all facilities for attending the market. At
its request the managers of the following
railroads have agreed to return all machines
and implements unsold at the international
market free of cost, provided that they are
sent to Hamburg by their lines: Coela Min-
den, the Altona Kiel, the Glückstadt Elms-
horn, the North Brabant, the Netherlands,
the Main Neckar, the Tilsit Insterburg, the
Rhenish, the Hessian Ludwig, the Royal
Bavarian and the Baden railroads. A simi-
lar privilege has been granted by the Ham-
burg American Packet Steamship Company,
the North German Lloyd, the Royal Nether-
land Steamship Company at Rotterdam and
Amsterdam, and the lines plying from Ham-
burg to Hull, Grimsby, West Hartlepool,
Liverpool and Christiania respectively. The
Gothenburg "Svenska Lloyd" have reduced
the freight for the return voyage to Sweden
to one-half. Other administrations ad-
dressed, especially the Royal Prussian Min-
ister of Finance, have not yet returned their
decision, but without doubt the free return
of freight for machines or implements not
sold will be granted. Applications for par-
ticipation in the market are proceeding satis-
factorily.

The Atlanta Constitution says: We can
safely assert that the mines of North Georgia
in five years will yield as much gold as those
of California ever did. What more does a
man want than to pick up nuggets worth
\$40 or \$50? Only last year a party of road
hands, working the public road near Dahl-
onega, dug up a plug of gold as large as a
man's thumb. A countryman hauled a load
of cabbage 40 miles to this city from Dawson
county during this winter, and had in his
pocket, along with his tobacco and knife,
two pieces of gold that could not have been
worth less than \$25. He was just as care-
less with them as if they had been a couple
buckeyes carried to cure the rheumatism.
We said to him: "Is there much of this kind
of gold in your country?" "Yes," said he:
"but you have to dig for it." "Well, why
do you raise cabbages and haul them so far?"
He replied: "Well, you see, stranger, I
have to bring my wagon down to Atlanta to
carry back salt and iron and a few dry goods
for the old lady, and cabbage is about as light
a load as I can haul. I generally dig gold
when my crop fails."

Prof. Kedzie, in making his report of a
test of the minerals recently found in Wood-
son county, and supposed to be silver, says:
Though these specimens have been carefully
assayed, in none of them has there been
found any trace of the above metals—not-
withstanding the results claimed to have
been obtained by rough assays made upon
the spot. The specimens are, however, very
interesting from a mineralogical point of
view, and indicate a somewhat peculiar for-
mation in the locality. The so-called silver-
bearing ore is a cellular quartz rock of a
cherty character, containing in its cavities
fine quartz crystals and also incrustations of
various zeolitic minerals. The "gold" ore
is a decomposing zeolitic rock containing per-
fect crystals of calcite and filled with minute
glittering scales of yellow mica. The "cop-
per" ore is a fine specimen of massive phos-
phorite (lime phosphorite), evidently of cop-
per origin.

Gen. B. Collins
DESIGNER
ENGRAVER
OFFICE OF
"The Iron Age"
NEW YORK

CLARK BROTHERS & CO.,

SOLE MANUFACTURERS OF:

Clark's Patent Concave Carriage Bolt.

Best Bolt manufactured for all kinds of Agricultural Machinery. Will not split the wood, and cannot turn in its place.

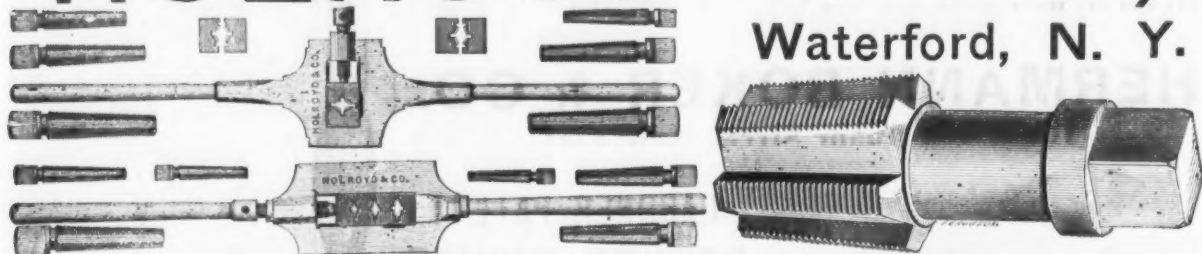
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Philadelphia "STAR" Bolt Works.

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FANCY HEAD BOLTS,

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HOOPE & TOWNSEND,

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MANUFACTURE

Machine & Car Bolts,

COLD PUNCHED

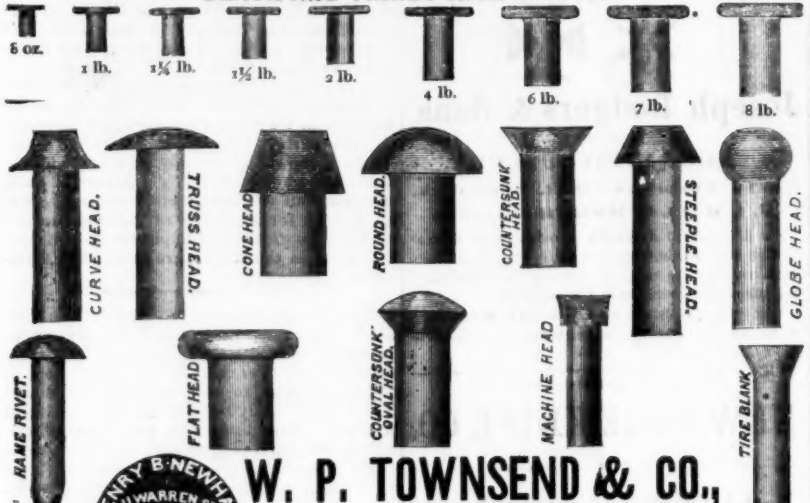
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One-sixteenth to five-eighths diameter.

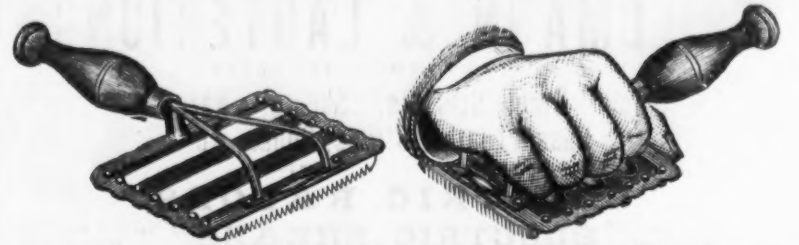
Heads and points to sample.

IRON, STEEL and BRASS.

Lyon & Fellows Mfg. Co.,

Cor. 1st and North 2d Streets, Williamsburgh, N. Y.

HOTCHKISS' PATENT "SUPERIOR" COMB.



We invite the special attention of the trade to our Patent "Superior" Curry Comb, which is the best and most complete side handle Comb having a grasp over the back now in existence, and which for neatness, strength and durability has no equal. Give them a trial and you will be convinced that they are superior to any Curry Comb in the market. They are neatly put up in paper boxes of one dozen each and packed 15 dozen in a case. For sale by the Jobbing Hardware, Saddlery and Woodenware trade.

HOTCHKISS' SONS, Bridgeport, Conn.

NEW IRON TACKLE BLOCKS.



Galvanized Malleable Iron Shell and Sheave, Steel Hooks. The strongest, lightest, easiest running and most durable Block yet produced. Send for sample and price list of same to

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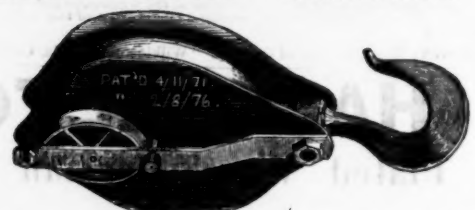
Or to J. H. Work, 13 Pearl St., Boston, Mass.; S. H. & E. Y. Moore, 68 Lake St., Chicago, Ill.; Henry B. Newhall, 11 Warren St., N. Y.



The Penfield Block Works,

Lockport, New York, Manufacturers of

THE COMMON SENSE HOISTING BLOCK.



With the Norcross Patent Bearings in place of the old style Roller Bushings. No more knocking out of Rollers or crushing of Bushings. We warrant this Block to be the most complete Anti-Friction Block in the world. It will stand the racket while others fail. It will soon pay for itself in the saving of rope alone. Send for sample and be convinced.



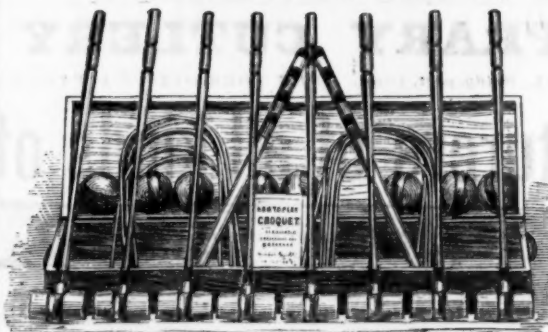
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Wood Turning in every
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N. B.—All our Croquet Sets are furnished with Galvanized Steel Arches.

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TOURNEE,

the new Lawn Cushion Game. The best game out, combining all the attractive features of both Croquet and Billiards. Send for printed description.

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MICA TO ORDER IN ANY PATTERN.

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OFFICE, 87 Liberty Street, New York.

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Manufacturer of
Brass, Iron, Steel and German Silver
SCREWS.

205 Quarry Street, Philadelphia.

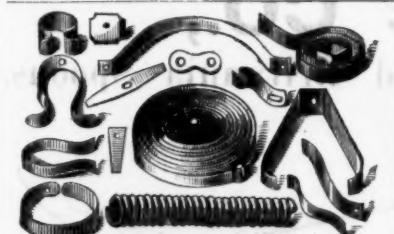
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Manufacturers of

Carriage & Wagon AXLES.

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Clock Springs and Small Springs

of every description, from best Cast Steel.

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STONES.LETOILE,
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Stones gotten up or labeled in
any style desired. Price and
quality guaranteed.
Ourst one are of good keen
grit: and will not glaze.

SPECIALTY

COAL WASHING MACHINES AND
IMPROVED COKE OVENS.

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STEAM PUMPS

Manufactured by

Crane Bros.,

Mfg. Co.,

CHICAGO.

Established in 1836.
Shelton Company,
Manufacturers of every variety of
TACKS & SMALL NAILS,
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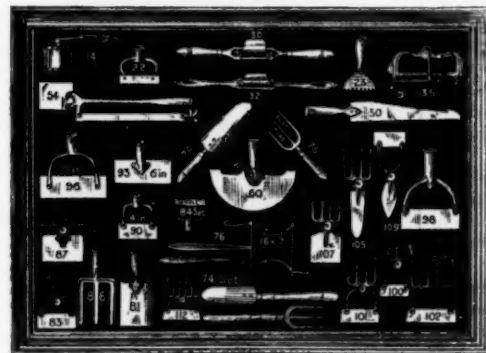
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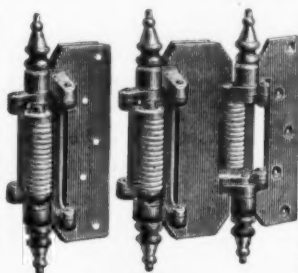
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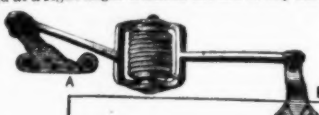


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The Iron Age.

New York, Thursday, March 28, 1878.

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Although *The Iron Age* has never laid claim to being an export journal, its value as a medium of information to those manufacturing for export or desirous of securing foreign orders has met with generous recognition. The important editorial articles on trade with foreign countries are of especial interest and value, and are part of a series which will include all the principal markets of the world. Our statistical tables are compiled with great care from the latest and most trustworthy official publications, and from our analyses of imports and exports the student of foreign trade movements can learn much that could be gathered only by

a laborious search of statistics not easy of access. Our readers may be sure of finding in our columns whatever of interest or value can be obtained concerning foreign markets and our trade relations with them. We would also say that during the next half year *The Iron Age* will be extensively circulated in foreign countries with a view to making dealers and consumers aware of the nature and extent of American progress in the departments of manufacture we represent, and we shall be glad to receive early and full information of all new products and improvements in manufactures of metals, hardware, &c.

Our Trade with Italy.

There is no nation in Europe whose moral and material development has of late years made such extraordinary strides, in consequence of political unification and harmony, as the kingdom of Italy, and she now ranks on a par with France and Germany in nearly everything constituting national greatness. With a population of 26,801,154, Italy now possesses 4767 miles of railroad, or about 17 miles per 100,000 inhabitants. Of merchant craft she navigates under her flag 4402 sailing vessels with a tonnage of 1,296,985, and 110 steamers with 95,300 tons. The sailing-vessel tonnage of Italy in 1872 was 1,058,000; in 1875 it had increased to 1,222,000; in 1876 to 1,292,000, and in 1877 to 1,297,000. Of telegraphs in operation, Italy in 1875 counted 12,976 miles of lines and 45,308 miles of wires. There were 1726 offices with 1913 instruments and 4302 operators. The number of messages sent was 5,209,000, or 191 messages to the 1000 inhabitants, while the post offices forwarded 4500 letters per 1000 inhabitants.

The following comparison will suffice to show the relative importance of Italian trade:

	1877.	1876.
England.....	\$2,093,301,645	\$2,078,664,875
France.....	1,448,138,200	1,512,791,400
Italy.....	424,765,317	508,813,343

From this we see that Italy as yet does a comparatively limited trade; but this is not by any means owing to a lack of activity and enterprise. England and France are the richest countries of Europe, and both own large and prosperous colonies, while Italy has none of the latter, and has just commenced to rise from a long period of political chaos, partial anarchy and impoverishment.

Still the revenue of all sorts which the government collected during the first 11 months of 1877 amounted to no less than \$251,352,834, showing an excess over the corresponding period of 1876 of \$26,340,900, and this during a time of great industrial stagnation and short crops. Half of the silk spinners of Italy were compelled to stop work last year, and one quarter of the silk looms are in the same position. The woolen industry in Italy in 1877 was in no better condition. On the other hand, cotton spinning has suffered less severely, but the looms have not prospered, and cotton printing struggles with difficulty against German competition.

Since 1873 the Italian iron and steel works have limited their production almost exclusively to metal of high quality. In steel making, the Martin-Siemens and Pernot processes have of late been more generally introduced, and it is hoped that Italy will soon occupy a more important position in this trade. Ship building in Liguria has declined from 90,000 tons to 50,000 per annum, owing to the general depression.

Considering all this, it must be admitted that Italy has done wonders in collecting a revenue largely in excess of 1876, and it is evident that the resources of her people are varied. The government tax on real estate during the 11 months amounted to no less than \$30,164,097, being \$66,974 in excess of the corresponding period of 1876; the income tax produced \$27,348,586, an increase of \$880,517; the duties, \$18,409,332, an increase of \$84,633; the stamp tax, \$24,882,002, an increase of \$1,878,170; the salt and tobacco "regio," \$26,589,630, an increase of \$1,142,065. The only decrease of note is in the lottery tax, which shows a decline of \$752,890—a most creditable feature.

The following shows the foreign trade of Italy in 1877 as compared with 1876:

	1877.	1876.
Imports.....	\$256,608,668	\$265,427,460
Exports.....	193,304,709	243,355,683
Total.....	\$424,765,317	\$508,813,343

This shows a total decrease of 17 per cent., the import being 13 per cent. and the export 20 per cent. less. The following shows the details of the Italian trade movement in millions of dollars:

	—Import—	—Export—
	1877.	1876.
Liquors and oil.....	12.4	9.4
Colonial and chemical products.....	31.8	32.8
Fruit and vegetables.....	3.0	2.5
Butter, grease & cheese.....	5.0	5.6
Fish.....	4.1	4.1
Cattle.....	2.1	3.5
Hides and leather.....	0.7	3.0
Hemp, flax and manuf.....	6.0	6.6
Cotton and manuf.....	31.4	32.8
Wool.....	18.0	19.2
Silk.....	22.4	46.3
Grain.....	18.6	21.0
Wood and woodware.....	10.9	8.9
Paper and books.....	2.5	1.5
Fancy goods and other merchandise.....	19.2	18.4
Metals and manuf.....	15.6	14.7
Gold, silver and jewelry.....	4.1	5.1
Stone and coal.....	2.9	3.1
China and glassware.....	10.2	10.1
Tobacco.....	3.3	6.8
Total.....	\$256,608,668	\$265,427,460

The greatest falling off in any one article has been in silk, both import and export. The import of grain has also diminished, owing to the rise in prices. In the import

of coal, colonial produce, cattle and tobacco, as well as in textiles, there has been less activity, due to the less flourishing condition of the laboring classes. In the export of olive oil alone there has been a decrease of \$6,000,000, and the vintage of 1876 having been a partial failure, the export of wine also decreased materially in 1877. The same may be said with respect to the almond crop and export. On the other hand, the cattle export shows a notable increase, mostly to France, which country now consumes enormous quantities of Italian cattle.

The iron of the island of Elba, the lead and spelter of Sardinia, and the manganese of Tuscany have been exported in increased quantities. Italy has exported less eggs than usual; still the amount which left the country figures up some \$4,000,000. One of the noteworthy features of an increase of import has been in sugar, of which Italy took 6 per cent. more than in 1876, although the duty was nearly doubled.

The articles which we principally draw from Italy are marble, fruit, sulphur, certain drugs, and rags. The following has been the trade between Italy and the United States during the past 14 years in thousands of dollars:

Fiscal years.	Our Domestic Import.	Foreign Export.	Total.
1864.....	3,125	3,159	6,284
1865.....	2,201	6,665	8,866
1866.....	4,283	4,934	9,217
1867.....	5,289	4,933	10,222
1868.....	4,510	5,434	9,944
1869.....	6,210	5,563	11,773
1870.....	6,542	6,145	12,687
1871.....	7,444	6,090	13,534
1872.....	7,592	5,439	13,031
1873.....	7,975	7,244	15,219
1874.....	8,499	8,379	16,878
1875.....	9,190	7,227	16,417
1876.....	7,629	7,770	15,399
1877.....	7,105	8,484	15,589
Grand total.....	87,694	87,153	174,847

It will be seen that we have imported from Italy during the above period precisely as much as we exported to that country, and that our general trade with the Peninsula has doubled since the war.

The following are the principal articles of domestic production which we exported to Italy during the fiscal year ended June 30, 1877:

	Value.
Indian corn.....	\$72,837
Cotton goods.....	1,334,719
Steam engines.....	2,850
Hides and skins.....	12,800
Machinery.....	1,734
Leather.....	1,100
Naval stores and petroleum.....	2,583,331
Cotton seed oil.....	438,028
Preserved meats.....	2,650
Sewing machines.....	1,284
Nimber.....	1,555
Tallow.....	77,778
Leaf Tobacco.....	3,734,920
Clothing.....	1,475
Furniture and shooks.....	168,184
Timber.....	28,869
Furniture.....	5,555
Other goods.....	78,530
Total.....	\$8,484,496

It thus appears that Italy takes from us scarcely anything beyond raw produce. Yet we feel the most positive conviction that we can furnish Italy to mutual advantage leather, hardware, all sorts of machinery and woodenware, if we will but take the pains of thoroughly investigating the field now monopolized by England and the surrounding Continental nations.

ENGLAND'S EXPORT OF IRON, STEEL AND MACHINERY TO ITALY.

	1877.	1876.
Bar, angle, &c., iron.....	\$857,555	\$879,290
Hoops, armor plates, &c.....	573,100	583,565
Iron rails.....	783,595	756,365
Steel rails.....	544,950	535,000
Total.....	\$2,462,110	\$2,969,785

Our facilities for trade with Italy are practically as good as those enjoyed by English exporters, for the steamers leaving American ports regularly for the western ports of the Peninsula and Sicily, touching at Gibraltar, Malaga, &c., make the trip almost as fast from New York as they can from London and Liverpool, and the difference in freight, if any, cannot be great.

If we are to have another international exposition within the next few years, it is pretty certain that it will be held in Rome; but in the meantime our manufacturers will do well to examine closely the Italian exhibit at Paris, since it will probably be fruitful in valuable suggestions to them. Meanwhile the Italians, on visiting the display we shall make at Paris, will have an opportunity to examine our goods, and valuable connections will no doubt spring from it. The beginnings of such a trade should be heartily encouraged. Italy is a kingdom which has a great industrial and commercial future, and we cannot afford to neglect any opportunities of trade which may enable us to find there a market for our manufactures.

Railroads and Passengers.

It is beginning to be pretty well understood that however arbitrary the rules which a railroad company may print upon their tickets, the passenger who purchases a ticket does not thereby surrender any of his own rights, and does not by the purchase and use of a ticket enter into any contract with the company to the prejudice of his rights under the common law. The *Railway Age* has lately been at the trouble of compiling the decisions of the courts in suits of passengers to recover damages for ejection from trains, and draws therefrom the following conclusions, which are of interest to business men and commercial travelers, for whose information we reproduce them:

1. A railroad company may make reasonable regulations for the carriage of passengers. Conversely, a passenger cannot be compelled to obey regulations of an unreasonable nature. Whether a regulation be reasonable or not must, in case of controversy, be determined by the courts.

2. A passenger must exhibit his ticket when so requested by the conductor, or he may be removed from the car.

3. A passenger must surrender his ticket when

demanded by the conductor, or he may be ejected, but if the conductor takes the ticket before arriving at destination, he must give the passenger a conductor's check or some other evidence of his right to ride.

4. It seems that if a passenger persists in his refusal to pay fare until actually ejected, he forfeits his common-law right to reenter the car, even though he tender the demanded fare.

5. A railroad company has the right to make a moderate discrimination in the rate of fare between those who purchase tickets and those who do not. If a passenger has not procured a ticket he must pay the additional rate or be removed from the train.

6. A railroad company must afford reasonable facilities for procuring tickets, but the ticket office need not be kept open after the advertised time for the train to depart.

The decisions of the courts fully sustain these conclusions, which show that a passenger has all the rights which he needs and that he can compel the railroads to respect them.

Tariff Tinkering.

No man of business, whatever his views on subjects belonging to the domain of political economy, can have failed to learn from the experiences of the past three years the evils entailed upon the productive and distributive industries of the country by the tariff tinkering of successive Congresses. The fact that the newly constituted Ways and Means Committee of each reorganized House of Representatives is quite certain to attack the tariff and propose more or less sweeping changes, and that the changes may receive the favorable consideration of Congress, adds an element of uncertainty to all business operations which cannot but retard national progress and discourage enterprise. When men of capital know upon what to base their calculations, they are ready to proceed with any undertaking which gives promise of success; when the probability exists of changes in the tariff which may alter our whole revenue system and compel a readjustment of taxation, capitalists become timid and capital shrinks from investments which may be unfavorably affected by such changes. The agitation of the tariff question, growing out of the action of Mr. Wood in preparing a new scheme of imposts, has already done the country incalculable injury, and we have no assurance, whatever the fate of Mr. Wood's bill, that the same cause of disturbance will not arise annually so long as we have a tariff to tinker with.

For the protection of the business interests of the country against the evil consequences of continuous and unnecessary meddling with the tariff, several plans have been proposed. One of these contemplates the appointment by the President of a commission, advisory in character, to take testimony and supply Congress with information. Another proposes the establishment of a national department of commerce, or a bureau of trade, which shall collect and classify information bearing upon industry and commerce, and supply the Ways and Means Committee with the facts and statistics which its members have neither time nor opportunity to gather. Either system might be attended with benefit if practically applied under good management, but for immunity from the evils of tariff tinkering we are, unfortunately, dependent upon the good sense of Congress. That this is an uncertain and unsatisfactory dependence is the more to be regretted.

It may be stated as a correct principle that, however defective the tariff system of a country may be, when that system is fairly established and in operation it cannot be swept aside and replaced by another system constructed on a different plan without giving rise to serious and far-reaching evils. Such sweeping changes affect a countless number and variety of inter-related trades and industries, compelling a sudden readjustment to a new basis which cannot but be attended with a shock to the material interests of the whole people. On the other hand it is possible to rearrange the tariff when necessary without causing serious general disturbance. The natural ambition of the newly appointed chairmen of the Ways and Means Committee to signalize their accession to a little brief authority by undertaking the work of revising the tariff as a whole, has been repeatedly rebuked by the rejection of their bills by the House or Senate; but the sense of Congress on this subject should be expressed in other ways more likely to be understood. It requires very little practical statesmanship to discover that in four or five years the tariff could be changed without shock, if such changes are properly managed, and with so gradual a readjustment to the new conditions that the worst effects of such a change would never be felt. Accepting it as a fact that for the present the tendencies of tariff legislation are opposed to the principle of protection, it is certainly not too much to expect that the gentlemen who are bent upon abandoning the policy which has been attended with so much benefit to the country, shall have some regard for the public interest in choosing the method of carrying their ideas into effect.

It is considered probable that the bankrupt law will be repealed before the close of the present session of Congress. Memorials praying for the repeal of the bill are pouring in from all parts of the country, and the law has no strong support even in the East. The Senate Judiciary Committee have already reported a bill to repeal the act of 1867 and all subsequent amendments. It is provided that all cases pending in the district courts of the United States and docketed on or before the 20th day of October, 1877, may be tried and determined under the law as it now exists.

American Interests in the North of Europe.

In our issue of March 7th we published a short note concerning the introduction of American machinery into Denmark. Since then we have obtained a large amount of additional information from the gentleman to whom we were indebted for the facts previously published. This gentleman has been in Denmark for some time, engaged in the introduction and erection of American machinery, and has carefully studied the wants of the country, its peculiarities, and the openings for the introduction of American manufactures. For this work he is especially fitted, both by education and experience, being a practical man and having had much experience with American machinery and manufactures in South American countries. While in Denmark, Sweden, Norway and Schleswig-Holstein he paid particular attention to the manufactured articles used, and the openings for the introduction of new styles, &c. Denmark and Schleswig are essentially farming countries, and manufacture very little. Hand labor is almost exclusively employed in the few primitive branches of industry which are carried on. The hardware, agricultural implements and tools generally, as well as articles of domestic use, are roughly made, and in many instances we should think them of bad design; but our manufacturers must not be misled by the notion that our designs, styles and patterns have but to be seen to sell. People of all countries have not only their own ideas in regard to the tools they use, but they have their own needs which very frequently depend upon local circumstances. Habit also is strong. For example, we may take the American pail, which is light, strong, durable and cheap, and handsome withal. Our informant found it useless to attempt to sell these pails in Denmark. He found, however, that it was perfectly feasible to take over the American pail machinery and set it in operation, turning out pails of the Danish patterns. Of course some improvement could be made in style and workmanship, but the pails are still Danish. The same is true of many other classes of our manufactures. We can suggest improvements upon Danish patterns, but we cannot in all cases send goods abroad just as we turn them out for ourselves. There are, in fact, very few of the American patterns that suit the Danish market.

In regard to pail machinery and pail making, it is an interesting fact to note that a large proportion of the pails made in England are made by hand, and we can find traces of but one set of pail-making machines in Great Britain, and that was sent over from Wincendon, Mass., some 25 years ago. In this country no pails have been made by hand for the last 35 years.

The lesson to be learned by our manufacturers is a double one. We must not always gauge the wants of foreign markets by the demands of our own. The wants of such a country as Denmark must be carefully studied, and our exports adapted to these wants. The second point is that a personal representative of the exporter or manufacturer should canvass the ground, attend to the introduction of the goods and gather such information as may be useful to the manufacturer—packing, shipment, &c., &c. In some cases this can be trusted to a resident agent or firm, but such an agent should know all about the manufactures and trade of both countries. In any case the manufacturer will be benefited by a personal knowledge of the country.

Among the articles which may, we are informed, be introduced with profit into the north of Europe are clothes-wringers, mangles, feed and flour mills, and axes; the latter are already in the market, but they are all imported by way of England and are, consequently, expensive. With modifications to suit the wants of the country, we can also send forks, spades, shovels, hoes, rakes and hatchets; these are all of rough and clumsy pattern, and are mostly brought from England. One of the principal Danish hardware manufactures makes shovels, toys, hatchets, andirons, spades, &c., but of very crude, primitive design, and without the use of any machinery. Horse-shoe nails ought to find a market when the value of the American product is known. Carriage irons are all made by hand, often welded up from scrap, in a most primitive way. If their special patterns were made, as well as blanks, of the right kind, they might be introduced to advantage. Our iron axes and steel carriage springs would probably find a good market, the former not being used, while the latter are hand-made exclusively. The locks now used are of the old wooden pattern, which went out of use in this country years ago; it would seem, therefore, that many styles of American locks could be sold there. The amount of hand labor employed in the few industries carried on is simply astonishing. In one shop our informant saw Singer's sewing machines in process of manufacture, and with the exception of the shuttle and one or two other parts which were purchased ready made, the whole machine was hand made.

There is one fact in connection with the introduction of our manufactures that is favorable to us. Americans have a very good reputation. Our manufactures are believed to be always up to sample, and in opening a case the Danish importer does not expect to find that the sample was a picked

article and the lot manufactured to sell. In this respect we have the reputation of being far ahead of England, since English goods are rarely up to sample. The people are favorably inclined toward our country, and the American does not have those prejudices to overcome which are sometimes so seriously in the way.

There are no decent cook stoves in either Denmark, Sweden or Norway; those in use are somewhat upon the English plan, but even more crude in design, inefficient in operation and wasteful of fuel than the English. In the cities and large towns English coal is the fuel used, while in the country beech wood and peat are chiefly burned. Stoves, however, cannot be introduced by simply sending them over to an agent. They must be popularized by personal effort, and the people must be taught how to use them. With the introduction of our stoves might go that of anthracite coal. This could probably be burned to advantage in their grates and a respectable traffic in it be obtained.

Builders' hardware, if made to accommodate their special uses, would be very easily sold. The difference between their patterns and ours can be judged from a single item of windows. There the sashes are hung on hinges and swing inward—the hinges being fastened by bolts which go clear through the wood, and, if we understand our informant correctly, the hinge which embraces both sides of the sash is secured by riveting the bolt. Manifestly the swinging sash precludes the possibility of selling much variety of window hardware adapted for use with sliding sashes.

Carpenters' tools can find a market if sent direct, but at present they are excluded from use owing to their extremely high price. The few that come into the country are much liked, but as they come by way of London and Hamburg, the prices put them beyond the reach of the workman, who cannot afford to pay three profits on them. Braces, bits, augers, &c., are among the tools which are known but which do not sell for these reasons. The plows used are of the English pattern, long shares with easy lines, admirably adapted to turning over a deep, rich, soft soil. These plows are the same pattern that beat ours in the competition of 1851 in London. While they would be utterly useless in breaking up the tough ground of our Western lands or steering among the stones and stumps of New England, they are just what is wanted to turn over, with a minimum expenditure of power, the soft mould of Danish farms. In this we must follow the English pattern. Agricultural engines of from 12 to 25 horse-power are in demand; but here we must give our readers a word of warning in regard to the method of rating engines. The few American engines in the country work well, are economical and give good satisfaction, but they are considered of small power as compared with the English of the same rated power. The reason for this is quite evident. When an American sells a 6 horse-power engine he sells one which, with the ordinary working pressure and the usual number of revolutions per minute, will develop 6 horse-power of 33,000 foot pounds per minute and have a reasonable margin to spare. On the other hand, when the Englishman sells a 6 horse-power engine he sells one which, according to James Watt's old rule, assuming a very small pressure and a fixed piston speed per minute, would give the required 6 horse-power. As the pressure is many times that assumed, and the speed generally twice as great, the actual horse-power is usually somewhat over three times as great as the "nominal" or selling horse-power. In selling engines, therefore, where the English "nominal horse power" is used, this fact should be kept in mind. It is a noticeable feature, in connection with American portable engines, that in Denmark they have the reputation of standing up to their work well, the boilers being easily able to furnish the engine all the steam needed at the regular pressure at which the engine was designed to work. On the other hand, the English engines are reported as deficient in boiler power, the pressure running in one case from 60 pounds per square inch down to 25, and staying there when the speed of the engine was kept constant. This does very much toward equalizing the difference between the nominal and actual horse-power. Want of boiler power seems to be a pretty general failing with the English agricultural engines, and ample boiler power a characteristic of the American. The sizes of engines in demand range from 6-inch diameter of cylinder and 12-inch stroke to 8-inch diameter of cylinder and 14-inch stroke.

Our manufacturers, in sending tools and small machines to foreign countries either upon orders or for exhibition, should be upon their guard against imitations. Patents and patent rights are so hedged in by laws and customs, that the only practical protection is to be able to export more cheaply than the articles can be made abroad. A case in point is that of Walker's jig saw. One of these was ordered by a firm in Chemnitz as a sample, and was sent out in due time. No subsequent orders were received, as the firm who gave the order were manufacturers and immediately began the manufacture of as good an imitation of the saw as they were able to make. This they are placing upon the European market, and it is now for sale all over Germany. The only way of meeting competition of this kind is to be able to sell a better article at a lower price than that produced by the imitators, and at the same time taking care to fill the market. Patents will hardly protect abroad, and dependence must be exclusively upon business competition.

The Wood Tariff Bill.

The fate of the Wood tariff bill will very soon be decided. Very early in its career in the house a test vote will be taken which will indicate the feeling of that body as to its passage. There is no doubt that the most strenuous efforts will be made by its friends to pass it. Almost any concession will be agreed to and almost any increase from the rates at first proposed conceded, if such increase will still leave a slight reduction in the tariff. Even some of the best friends of protection who are members of the dominant party in the House, will vote for the bill if the changes are only slight.

Here is where the great danger is. If the bill is passed even in a modified form, the reason will be purely a political one. It will not be for revenue, nor principle, nor to better the condition of the country, but solely for use at the hustings in certain portions of the country. This statement is based on the actual assertion of prominent members of Congress. We still believe that the good sense of Congress, even of the House, will lead them to reject the proposed bill; but the most earnest efforts will be made to push it through, and equally strong efforts will be needed to defeat it. No man, manufacturer or workman, who has an interest in the continuance of protection should be idle, but should let his efforts be directed to the member from his district.

The following is said to be the shape in which the provisions relating to metals stand in the revised bill which the House will be called upon to consider:

SCHEDULE E.—METALS.

Iron in pigs, \$5 per ton.
Iron ore, 50 cents per ton, and scrap iron, wrought, \$5 per ton.
Scrap iron, cast, \$3 per ton.
Scrap steel, \$5 per ton.
Boiler and other plate iron and sheet iron, common or black, not thinner than No. 20 wire gauge, 1 cent per pound; thinner than No. 20 and not thicker than No. 25 wire gauge, 1½ cent per pound; thinner than No. 25 wire gauge, 1½ cent per pound.

Russia polished sheet iron, 3½ cents per pound.
Taggers' iron, 1 cent per pound.
Smooth or polished sheet iron, by whatever name designated, not otherwise provided for, 1½ cent per pound.
All band, hoop and scroll iron from ½ to 6 inches in width, not thinner than ½ of an inch, 1 cent per pound. All band, hoop and scroll iron from ½ to 6 inches wide, under ½ of an inch in thickness and not thinner than No. 20 wire gauge, including cotton ties and cotton tie strips, 1½ cent per pound. All band, hoop and scroll iron thinner than No. 20 wire gauge, 1½ cent per pound.

Steel railway bars, ½ cent per pound.
Screws, commonly called wood-screws, 2 inches or over in length, 5 cents per pound; such in length and less than 2 inches, 7 cents per pound; under 1 inch in length, 10 cents per pound.
Manufactures of iron of every description, not otherwise provided for, made up in whole or in part of iron or of which iron is the component of chief value, 35 per centum ad valorem. On steel made by the crucible, Bessemer or open hearth, or by any process without regard to the percentage of carbon contained therein, or of whatever form or description not otherwise herein provided for, 2½ cents per pound. On all other steel, including steel wire, steel wire rope and steel commercially known as wire rope, cold-chambered steel wire, and all manufactures of steel made in whole or in part of steel, not otherwise provided for, 35 per centum ad valorem. Provided, that no allowance or reduction of duties for partial loss or damage shall be hereafter made in consequence of rust of iron or steel, or upon the manufactures of iron or steel, except on polished Russia sheet iron.

Lead ore, 1½ cent per pound.
Lead in sheets, pipes or shot, 2½ cents per pound.
Lead in pigs and bars, and old scrap lead fit only to be remanufactured, 2 cents per pound.

Zinc, spelter, tutenague, manufactured in blocks or pigs, 1½ cent per pound.
Zinc, spelter, tutenague, in sheets, 2½ cents per pound.

Tin in plates or sheets, tinned and taggers' tin, 1 cent per pound; in bars, pigs or blocks, and in all forms in which the copper is metallic, 80 per centum ad valorem.
Iron and tin plates galvanized or coated with any metal by electric batteries, 1½ cent per pound.

Iron and tin plates galvanized or coated with any metal otherwise than by electric batteries, 2 cents per pound.

Copper in ores, matte, or regulus, and in all forms in which the copper is not advanced to the metallic state, 1 cent per pound on the fine copper contained (fire assay); any gold or silver accruing thereon to be free of duty.

Copper in pigs, bars, slabs, precipitated copper and in all forms in which the copper is metallic, of below 98 per cent. purity (fire assay), 2 cents per pound on the fine copper contained.

Refined copper of commercial purity, or 98 per cent. and upward, in ingots, cakes, tiles, bars, shot, and all forms not rolled, 3 cents per pound.
On rolled copper in sheets, plates, bolts or bars, and hammered copper, 5 cents per pound, except sheathing copper in sheets of 48 inches long and 14 inches wide, from 14 to 24 ounces per square foot, which shall be 3 cents per pound.

Yellow sheathing metal and yellow metal bolts of which the component part of chief value is copper shall be deemed manufactures of copper, and shall pay a duty of 35 per cent. ad valorem.

On articles manufactured of copper, or in which copper is the component of chief value, not otherwise provided for, 35 per cent. ad valorem.

On old copper fit only to remelt, two cents per pound.

Gold leaf \$1 per package of 500 leaves, and in like proportion for any number of leaves.
Leaf, 20 cents per package of 500 leaves and in like proportion for any number of leaves.

Dutch and bronze metal in leaf, 10 per centum ad valorem.

Argentine, alabata or German silver, unmanufactured, 25 per centum ad valorem.

Brass in bar or pigs and old brass fit only to be remanufactured, 10 per centum ad valorem.

Articles not otherwise provided for, made of gold, silver, German silver, or of which either of these metals shall be a component part of chief value, 40 per centum ad valorem.

Silver-plated metal in sheets or other form 25 per centum ad valorem.

Manufactures, articles, vessels and wares not otherwise provided for (of brass, iron, lead, pewter and tin or other metal except gold, silver and platinum) or of which either of these metals shall be the component part of chief value, 30 per centum ad valorem.

Metals unmanufactured, not otherwise provided for, 20 per centum ad valorem.

Antimony, crude and regulus of, three-quarters of one cent per pound.

This shows that some of the most serious blunders of the first draft have been noted and in part corrected. It does not yet appear, however, that such changes as are now proposed are either desirable or necessary, and we doubt if the popular opposition will be mollified by the concessions which have been made by the committee.

Exhibitors at Paris whose goods were sent by the Supply, will be glad to hear of the safe arrival of that vessel at Havre. The Constellation sailed yesterday heavily freighted, and, with the exception of the Wyoming, is the last vessel that will be sent by the government on this mission. The

rest of the freight still at the Navy Yard, amounting to some 700 tons, is to be shipped by the regular merchant line of French steamers. A part of the \$150,000 appropriated by Congress for the exhibition of American goods will be used to pay the freight of the goods now awaiting transportation.

The telephone promises to be an invaluable boon to the Chinese, since they have no alphabet to use in telegraphing. There are already in use in China 500 miles of telephone wires, and the outlook for a rapid extension of the system is favorable.

Scientific and Technical Notes.

The Russian *Journal of Artillery* states that an Austrian manufacturer has recently arrived at St Petersburg, and has offered to sell to the Russian Government the secret of the fabrication of

A NEW EXPLOSIVE.

This substance, which is called "heracline," is, the inventor asserts, far superior to ordinary gunpowder or dynamite for blasting or mining purposes, and when prepared in a special manner may also be employed with advantage as a bursting charge for shells. Used as a charge for mines, the new explosive is said to act with a much greater energy, and produce a much greater effect, than the same quantity of powder; and, as both its density and cost of manufacture are considerably less, a saving of from 40 to 45 per cent. will be effected by employing it. It is also the least dangerous of any explosive, as it cannot be exploded either by a blow or by friction, but only by bringing a flame into contact with it in a closed vessel. It may therefore be ignited either by electricity or by Bickford's fuse; but the detonating fuse required to explode dynamite with effect is not wanted. Compared with this latter substance, heracline can be prepared at one-third the cost, and the effect produced by equal quantities of the two compounds is said to be very nearly the same. The actual cost of preparing the heracline in Austria, where the inventor has already manufactured and patented it, is given at 30 florins (13.59c.) per 100 lbs. and the patentee now offers to make a sufficient quantity for the Russian Government to carry out a series of experiments, finding the necessary substances himself, if the Russian authorities will place one of its powder mills at his disposal. For the present the proposal has been declined, but 250 kilograms of the explosive have been ordered to enable the Russian engineers to make experiments with it in mining operations, and also as a charge for hollow projectiles.

A Berlin mechanic has contrived an ingenious

SELF-ACTING DOUBLE HINGE

for storm doors, double doors, &c., opening in one or both directions, the device allowing the door to move easily and noiselessly, and also to be fixed at an angle of a little more than 90 degrees, if desired, without any fastening. The door moves on a pivot at the top and bottom, the rear end at the bottom resting in a shoe, to which it is firmly screwed, and which has the pivot attached to it beneath, and also a small wheel a little in front of the pivot. Now, as the door is opened, this small wheel moves upon an arm of a lever, the other arm of which is in contact with the end of an almost circular horizontal spring, which carries the door back to its normal position as soon as it is released, the power being greatest just when the door is released, and diminishing in effect until it is completely closed. The spring, lever, &c., are inclosed in a cast-iron box, covered with a brass plate, screwed to it, countersunk to the level of the floor. The upper socket, set in the casing of the door, is attached to a plate, which has a slit and set-screw, so that it can be moved forward or backward slightly, and thus be adjusted to any inaccuracies in hanging the door. The upper pivot is let into the top of the door and rests upon one end of the lever, also let into the top of the door, and is forced up into the socket by means of a screw which acts on the other end of the lever, nearer the front of the door, thus rendering it easy to hang or remove.

Much interest has been excited of late by the discovery of an alarming prevalence of

COLOR BLINDNESS AMONG RAILWAY OPERATIVES.

to which is attributed many of the accidents growing out of inability to distinguish the color of signals. Mr. Thos. T. Nelson, optician, of Chicago, makes the following contribution to the literature of the discussion: "From the first I have been accustomed to unite with the subject of color blindness that of quickness of perception, as I found in my experiments that very many not actually color blind were practically so from the sluggishness of their perceptive faculties, and I also found some who were unable to distinguish colors at certain distances, varying more or less in individuals, as well as some who were color blind at night and not in daylight, and vice versa. I have also considered with these defects, under the one general head, the optical defect called 'Myopia' generally known as 'near-sightedness,' and another defect called 'Astigmatism,' both of which exist to a greater or less degree in a large percentage of population, and in a majority of cases not suspected. Tablets and charts are not entirely practical except for day tests, since the results obtained with reflected light are quite different from those obtained when direct or transmitted light is used, and in practice the most important test in railway service is certainly that which insures the greatest safety at night. There are other questions constantly arising, among which is that of the circumstances under which color blindness may be acquired, but in the absence of records of individual cases kept for a period of time, this must remain a question for further investigation. My facilities for determining to any certainty just what part defective vision has had in railway accidents, has been very inadequate, the reticence of railroad companies upon the subject of accidents not being conducive to thorough investigation; hence I am com-

pelled in a great measure to reason by analogy, but I have no doubt that in many instances of blunders or mistakes which are usually attributed to carelessness or recklessness, where defective vision could enter as an element investigation would show that it was the prime cause of the accident."

The first experiment with

THE ELECTRIC LIGHT

in Berlin was made recently in the new synagogue in Oranienburg street, before a large crowd of people. In the courtyard of the building a stationary apparatus furnished the light, which was conducted over the roof into two of the five round windows, whence the light streamed down on the synagogue below. The effect was astonishing. The light was so brilliant that it illuminated the gallery and the remotest corners of the edifice. The splendor of the light was vivid, but not offensive to the sight. In comparison with gas, the result is as follows: Gas, per hour, \$15; the electric light, \$1 for the same time. The apparatus costs several thousand marks. The synagogue was also lit up outside by the electric light, bringing it out as bright as day, and producing a most magical effect. Gas burned alongside of the electric light looked pale, and was, as it were, thrown into the shade.

Mr. Arthur Fell writes to the *London Times* from Madrid, under date of February: "I am surprised to find that the *Puerto del Sol*, the principal place at Madrid, is lighted by electric light in a manner which, so far as the lighting is concerned, is most successful. This place is not like anything in London, but is something like the *Place Vendôme* at Paris. The lights are six globes of opal glass, in sets of three, on two lamp posts, which are about twice as tall as those usually used for gas. The first idea that struck me on entering the place was that there must be a full moon shining. The moon was, however, not yet up, and the cause which made all the shop gaslights look poor red flames was very clear. These six globes were, all of them, of equal brilliancy, and emitted a soft, pale, penetrating light, as steady as an argand flame. I found that about 30 or 40 yards from the lights I could read small print easily; still the lights give no painful glare whatever, but really formed charming objects, which it was difficult to keep one's eyes off. The moon soon afterward arose, and it was clear how wonderfully similar the two lights were. Each of the globes, at about 30 yards, seemed like a full moon, and gave about as much light. It seems strange that a country which we consider so backward as Spain should be experimenting with this light, and with such success, while London has not yet even tried the light."

After long use organ pipes become brittle and fall to pieces, doubtless because of the

MOLECULAR CHANGE EFFECTED BY VIBRATION.

The impurity of the metal does not appear to be the cause. In 1872 Oudenmanns called attention to the fact that plates of pure tin containing only 0.3 per cent. of lead had, during their conveyance from Rotterdam to Moscow in very cold weather, broken into very small fragments. At Spandau, more recently, similar disintegration was observed and noted by Dr. Petri. A large quantity of tin plate acquired, first laminar exfoliations, and then began to crumble. A large quantity of block tin also became affected in the same way as the tin plates, but to a less degree. The warehouses in which the tin was stored were dry, and the cold was not severe. Repeated little shocks, with frequent strong variations of temperature, are usually supposed to be sufficient to account for the crumbling, but it would appear that there must be other causes which remain to be discovered. Dr. Petri tested the tin which had disintegrated at Spandau, but it contained no phosphorus, no sulphur, no oxide of tin, and only the faintest traces of any other foreign metal.

At Bridgeport a few days ago an exhibition was given of

A NEW FLYING MACHINE.

invented by C. F. Ritchel, of Corry, Penn. Unlike many aerial machines, this one is not shaped like a bird, nor has it any wings. It consists of a large bag of cylindrical form inflated with hydrogen, and a car provided with attachment designed to control the elevation and descent of the bag and to direct its course. The bag is 24 feet long and 12 feet in diameter, and requires 3000 feet of gas for its inflation. The raising and steering apparatus underneath has a framework made of brass tubing, and is provided with a seat for the passenger. Directly in front of the seat is a crank which he turns to produce the power that puts in motion two small fans that can be operated singly or together. The elevating fan has five blades, set spirally, and can be made to rotate at the rate of 3000 revolutions per minute. This fan furnishes, or is intended to furnish, the lifting power which constitutes the novelty and value of the invention, and by reversing the motion depresses the air ship on the same principle as it raises it. At the end of the framework of the car, some 10 or 12 feet distant from the passenger, is another similar fan, which works at an angle with the air ship, and is designed to turn it in any direction desired. It may be stated that both fans work in the air on the same principle that the Fowler steering and propelling apparatus works in the water. The exhibition was given in a large hall, a boy operating the cranks. The boy commenced to turn the crank, the fan whizzed fiercely, and the bag rose three or four feet from the floor. It refused to go any higher, however, but after ascending slightly sank back toward the floor at each trial. Then the steering fan was set in motion, with about the same degree of success. The attendants ascribing the partial failure of the experiments to the boy who engineered the machine, another boy was substituted. He succeeded considerably better than the first, elevating the bag to the ceiling several times, and had turned it about half way around when the steering fan when two of the blades broke. The experiment led to the opinion that, with some changes in the fan, the machine might be made to perform as intended. As is well known, one great difficulty in balloon navigation is that the aeronaut is dependent for his elevation on the buoyancy of

the balloon alone; another is that its course is dependent on the direction of the wind. Mr. Ritchel thinks that his apparatus can be made to overcome both these difficulties.

A New American Piece of Heavy Ordnance.

The *Washington Herald* says: The Ordnance Department of the Army has constructed a large rifled gun, weighing about 90,000 pounds, with a caliber of 12.25 inches, which is now undergoing proof at the Sandy Hook proving ground, under the direction and supervision of the Ordnance Board. So far the limited firings have developed the most satisfactory results. The gun is of cast iron, lined with a coiled wrought-iron tube, with a length of bore of 227 inches, and is mounted on a carriage of late design, with all the modern improvements to control recoil and to facilitate loading and maneuvering. Although as yet the firings have been limited, still enough is known of the power of the gun to say that for use against ironclads it is equal, if not superior, to any gun of the same caliber in any service. The essential features which contribute to any superiority over others in this respect are length of bore, character of projectile and powder. In the foreign services the English 12-inch wrought iron gun has a length of bore of 198 inches; the Krupp caliber 12.008, has 222.5 inches; the Italian 12.6 has 252 inches, while the American is 227 inches long. This length adopted by the Ordnance Department gives all the useful effects that can be obtained from this source, and secures a thorough consumption of the maximum powder charges, as has been practically proved by the absence of any unconsumed grains of powder after the discharge. The powders used have given marked superiorities in velocities and pressures over those used in foreign services, the velocities being greater for corresponding pressures and the pressures much less for the service charges. No undue pressures have shown so far from the use of the adopted system of projectiles, no erosion or guttering are apparent, and perfect rotation has resulted from the rifling and sabot employed; and this, with the absence of any stripping, has given that accuracy of flight so necessary for a successful rifled projectile. The energies attained, or rather the capacities for work—the gist of the whole subject—compare most favorably with those of foreign guns, although the difference in charges and weights of projectiles do not, so far, admit of a complete comparison, but enough is known to show that this gun has an equal, if not a greater, capacity for work of any of the foreign service rifles of like size. For instance, the English 25-ton gun has given less energy by, say, 450 foot tons, with 85 pounds of powder and 600-pound projectile, than the American; and the Krupp, with 88 pounds of powder and 664 pounds of projectile, 1254 foot tons less; while the Italian, with 100 pounds of powder and 770 pounds of projectile, has only yielded a little over 400 foot tons more; and in these comparisons the American gun uses only 80 pounds of powder with a 600-pounder shot. But with 110 pounds of powder and 700 pounds of projectile the American rifle gives 9551 foot tons muzzle energy, or 246 foot tons per inch of shots circumference, an energy about as great as any gun known for this charge, and decidedly superior to Krupp's and the Italian, using heavier charges. With these encouraging results, by developing a strong and durable system of gun construction, with our superior powder and projectiles, and with our rifling and length of bore, it would seem that the Ordnance Department had produced a weapon able to cope successfully with the best foreign guns, and at a much less cost.

Everyday Uses of the Telegraph.

Telegraphy is the great time-saver in all business transactions. It may be used not only for these purposes, but also in those pertaining to domestic economy. For instance, the Duc de Montpensier has, it is said, attained great proficiency in this direction. Telegraphic communication connects every door in his mansion, and the duke can, whether he be in the boudoir, the library or—Guy Fawkes like—in the cellar, tell when a door opens, and which one it is. Indeed the system does not end here, for when more than one person of average physique crosses the vestibule, the door-mats are so sensitive that the signals are proportionately doubled everywhere, and the duke is made aware that a pair has entered. If the gentleman now occupying the luxurious chambers in Ludlow street ever visited the veteran statesman during his Spanish peregrinations, we suppose the signals were increased indefinitely, for Spaniards have not the privilege of entertaining men of his status every day. However this may be, it only shows us how much can be done with telegraphy. Every well-ordered hotel has a telegraphic call in each chamber, and our merchants are using it extensively. Bradstreets, with commendable enterprise, have no less than twenty-five branch offices in the city, each with direct wires to the head office. Those who can afford to do so should introduce telegraphy as a means of communication between every part of their household. This is coming, and it will not be long before an electric system of communication will be as necessary in warehouses and well-appointed dwellings as speaking-tubes and bell-wires.

American manufacturers of railway machinery and supplies have reason to feel encouraged from the beginnings of an export trade already inaugurated. During the year 1877, there were exported from the United States 64 locomotives, value \$633,501; 521 passenger and freight cars, value \$446,322; 6375 car wheels, value \$99,845, and 131,945 cwt. of rails, value \$281,198. Considering that it is but a short time since most of these articles were imported to this country in enormous quantities; the fact is full of significance. American iron manufacturers are now able to compete in point of excellence with the world, and a vast field for exportation is open to American enterprise.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The Amoskeag Ax Company, manufacturers of edge tools, have built up a trade extending all over the United States and into many foreign countries. Their factory has a capacity for producing 3000 axes, hatchets, &c., per week, and gives employment to 60 hands, 12 trip hammers and a large amount of the most improved machinery.

MASSACHUSETTS.

All prospects of having Gardner's pocket cutlery works removed from Shelburne Falls to Westfield are past, the committee who were appointed by the subscribers to the stock not reporting in its favor.

A Williamstown correspondent of the Springfield Republican writes: There is no change in J. Hayden & Co.'s affairs. All propositions made by Mr. Hayden to date have been declined. The works are running under attachment and a keeper, and orders are filled as usual. The estate may come to bankruptcy, but now offers a splendid chance for the formation of a stock company. The works at Haydenville, which are in perfect condition for manufacturing brass goods, with 40 tenements, can be bought on advantageous terms.

CONNECTICUT.

Business will soon be resumed at the works of the Miller Bros. Cutlery Company, of Meriden, their financial difficulties having been arranged.

The zinc mill in Shelton, formerly run by Phelps, Dodge & Co., will now be used as a brass mill by L. T. Wooster, for some years superintendent of Osborne, Cheesman & Co.'s brass mill in Ansonia, and W. H. H. Wooster, his brother, of Springfield, Mass. They have purchased the machinery of a brass mill that was burned in Chicago some time ago.

Business at the Wilcox Silver Plate Company, of Meriden, is getting so brisk that on Monday, the 18th inst., they commenced to run 10 hours a day.

The Higginum Manufacturing Company, of Middlesex county, makers of agricultural implements, are compelled to run their factory day and night in order to supply the demand for their goods. With all the modern machinery for making farming implements, this company is enabled to turn off work very rapidly. They recently made and shipped to New York 100 plows in a single day.

Bevin Brothers, of East Hampton, have been assigned a position for their exhibit of bells at the Paris Exposition. The Gong Bell Company will also exhibit goods. Their show of goods at the Centennial was very fine and without doubt will be equally fine at Paris.

NEW YORK.

Messrs. H. G. Giles & Son, of Troy, are in receipt of quite a large and important order from China for stoves, mainly of their best and most costly kinds.

The Oviatt Thresher Works, at Hudson, are rapidly approaching completion. The building is 150x52 feet, and covered with asbestos roofing. It is well lighted, having, besides the windows, seven skylights, each 3½x6½ feet. A well has been sunk in the building, securing an ample supply of water. A portion of the machinery was put in this week, and it is expected the works will be in running order early in April. A large number of orders for wagons and threshers have already been received from different sections of the country, and plenty of business for the coming season is assured. Inquiry as to the cost of 100 wagons delivered at San Francisco, has been received by the secretary from a firm in that city. The company will employ from 15 to 20 workmen to begin with.

The Lake Champlain Manufacturing Company of Ticonderoga, are putting a new 72-inch turbine water wheel in their works to drive additional machinery, soon to be introduced, in the manufacture of several new articles for which the company have already large orders.

The Ames Iron Works, at Oswego, are very prosperous in their business of engine building. Their works are among the largest in the country, and they are reported to have sold about 400 portable steam engines during the past year. Every piece of their machinery is fitted to a standard gauge, and duplicate parts can always be furnished. They also manufacture boilers, and keep them in stock up to 40 horse-power. Larger ones are made to order.

The knife works of George Barnes & Co., of Syracuse, and the Whitman & Miles Manufacturing Company, of Akron, Ohio, have consolidated into one company, and are now known as the Whitman & Barnes Manufacturing Company. They are organized under the laws of Ohio, and are engaged in the manufacture of mower knives and reaper sickles, sections, spring keys, &c. The works at both places employ about 300 hands.

The Siemens Cowper Cochrane Fire Brick Stoves at Crown Point, N. Y., have started and are perfectly satisfactory. Temperature in 24 hours, 1200 degrees. At 1500 degrees the escaping gas went off at 400 degrees. This is the first set erected in this country.

NEW JERSEY.

The Port Oram Furnace has gone out of blast.

PENNSYLVANIA.

Graham, Emlen & Passmore, of Philadelphia, have shipped upward of 800 of their Philadelphia lawn mowers to Germany since the first of the year. They have also shipped upward of 200 to Australia.

The Baldwin Locomotive Works have just entered an order for 10 locomotives from the Gilbert Elevated Railway of New York. They have also just received an order for four street motors from a Brooklyn company.

The locomotive built in the P. & R. shops, Reading, for the Paris Exposition, was completed on Saturday, the 16th inst.

On Monday, the 18th inst., the Pottstown Iron Company shipped eight car loads of nails—seven to California and one to New York. On Tuesday, the 19th inst., six more car loads started for California. Each car holds 200 kegs, which would be a total of 2800 kegs in two days. The nail factory of the company is in steady operation, and the demand for their nails is quite heavy.

AMERICAN SCREW CO.,

Providence, R. I.

Manufacturers of

IMPROVED
Gimlet Pointed Wood Screws,
Patented

May 30,

1876.

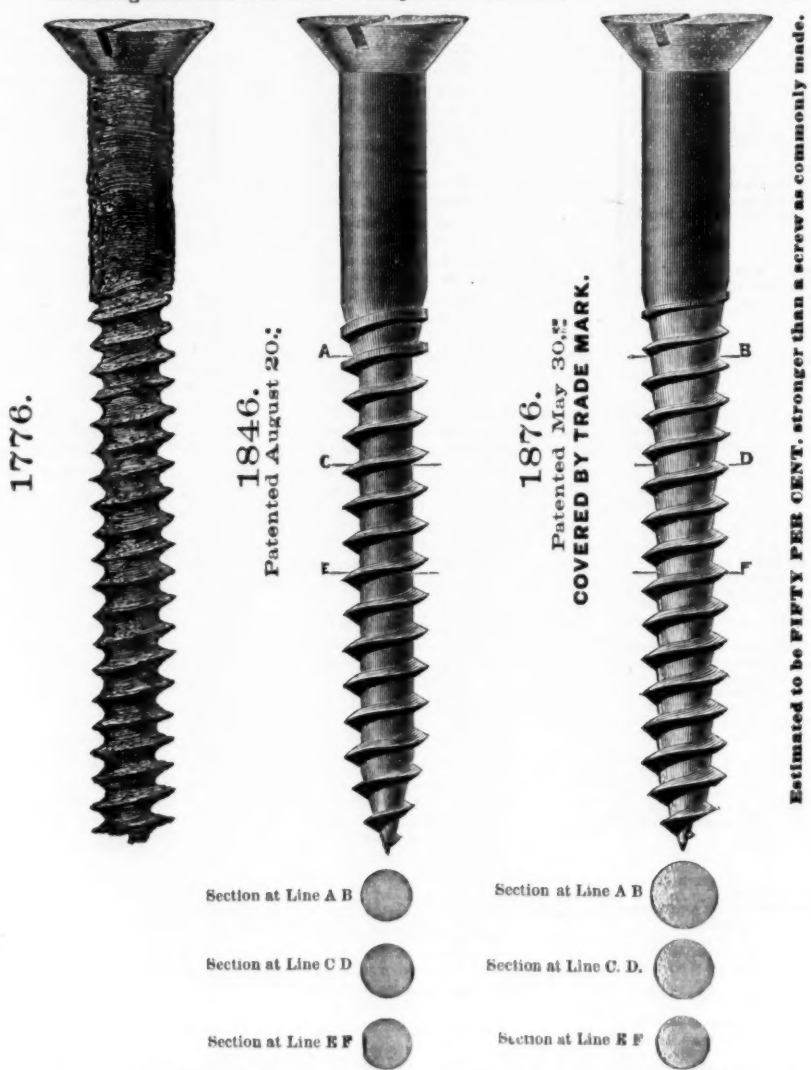


After forty years' experience we offer to the trade our Centennial Screw, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored boxes with new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

F. J. Obert shipped last week from his Union Boiler Works, at Reading, two tanks having a capacity of 30,000 gallons, to the Flat Rock Paper Works, at Manayunk. He also shipped last week for Canada a boiler 24 feet long by 6 feet in diameter, in which to pulp wood for use in the manufacture of paper.

It is not an aqueduct that the Phoenix Iron Company has contracted to build across the Hudson above Troy, but a via-duct. The contract is a good one, the explanation notwithstanding.—*Phoenician Messenger*.

The Phoenix Iron Company are converting the old cotton mill which they recently purchased—together with the balance of that property in the North Ward—into a machine and carpenter shop. It is rumored that the pattern makers will occupy the carpenter shop, and the present pattern shop will be used for the storage of patterns.

The Kauffman Furnace property, a short distance from Columbia, was sold by the assignee of C. S. Kauffman to H. M. North for \$100, subject to mortgages of upward of \$30,700, making the price for the furnace property \$30,800. The cars and personal property at the furnace were also sold to H. M. North, the cars bringing \$46 each. At the same time an ore lease in York county, having yet four years to run, was sold to A. J. Kauffman for \$51.

The Pennsylvania Canal Company, at Harrisburg, are having their large weigh lock scales rebuilt by Riehle Bros. This scale was built by the predecessors of the firm, and has been in active service for over 15 years, weighing loaded boats. It is said to have done remarkably well and weighs almost as sensitively as when first erected, notwithstanding its immense capacity, something like 500 tons.

We clip the following from the Sharon Herald of the 22d inst.: During the week ending Saturday, March 16, at the Westernman mill, hoop and guide mills double turn; bar and sheet, single turn; puddle mill and nail factory off; puddle mill went on Monday of last week, and Saturday, March 16, ended the nine off weeks of the nail factory; blast furnace doing well as usual. At the Kimberly mill, puddle, guide and both hoop mills double turn; nothing special from Keel Ridge Furnace. At the Stewart Iron Works, No. 2 doing as well as usual; no signs of blowing in No. 1, nor of again starting the bloom mill—not at least until the iron trade is in a little better condition than it is at present. From Greenville we have reliable information that the Rolling Mill Company have secured a contract for 5000 tons of cotton ties, and that operation will be resumed by the 1st of April for a certainty. The West Middlesex Mill resumed operation last week; two furnaces will be in operation, which is all that will go in at present. "No contract" this time. The Wheeler Iron Company are the parties doing it. The iron made at this mill last fall, of which mention was made at the time, gave good satisfaction at Pittsburgh. Then, as now, the specialty will be for the Siemens-Martin steel process. If a good market is got for the iron, the mill will go on to its entire capacity.

The Logan Furnace (C. C.) is in blast. All the iron made is worked into blooms, &c., at the works of the company using it.

PITTSBURGH AND VICINITY.

A meeting of the creditors of Rogers & Burchfield was held on Tuesday, the 19th, at the office of Register Shafer. The liabilities amount to \$430,000; under advisement, \$70,000. Total proceeds of assets sold, \$100,000; preferred claims and expenses paid, \$24,000; leaving net cash for distribution, \$85,000. A dividend of 15 per cent. was declared, which will leave about \$10,000 in the hands of the assignee, Mr. Reuben Miller, Jr. No other property remains to be sold.

The striking puddlers at the Forge and Iron Works, in the Ninth Ward, will resume work on Monday, the difficulties having been settled. It is stated that the strike was not legalized by the Amalgamated Association.

MARYLAND.

The Muirkirk Furnace has gone in blast to work up stock on hand.

VIRGINIA.

The Elizabeth Furnace, which lately passed into new hands, is to be immediately rebuilt and modernized. It is now known as the Ferrol Furnace and will go in blast about June 1.

WEST VIRGINIA.

The Quinnemont Furnace has been in blast since March 1, and is now making from 35 to 40 tons of foundry iron per day of very superior iron.

The Laughlin Nail Mill, recently organized at Wheeling, will probably start up the 1st of April.

The blast furnace at the Top Mill, Wheeling, will blow in soon.

The Whittaker Iron Works at Wheeling resumed operations on Tuesday, the 19th. At a meeting of the directors of the Benwood Ironworks, Wheeling, Tuesday, the 19th inst., A. W. Campbell was elected president of the company, vice Alex. Laughlin, resigned.

Mr. H. B. Miller, of Wheeling, has about perfected his arrangements for running a foundry in one of the shops of the penitentiary at Moundsville. He has contracted for the use of convict labor not exceeding fifty prisoners, and will manufacture any article in his line for which there is proper demand.

The Crescent Ironworks, Wheeling, resumed operations on Wednesday, the 20th.

Robert Murdy, of Parkersburg, has the contract for furnishing the Pittsburgh, Cincinnati and St. Louis Railroad 20,000 railroad ties, to be delivered at Steubenville, Ohio.

The sheet rollers at the Whittaker Mill, Wheeling, have resumed work, and the mill is now running full again.

The Riverside Nail Department, Wheeling, shut down last Saturday until April 1st.

OHIO.

The Kent Glassworks have been closed for a month for repairs.

Mr. Morgan, of Morgan, Williams & Co., has just returned from the Cambria Iron and Steel Works, Johnstown, Pa., after closing a contract to furnish that company with a large amount of machinery that will

**B. KREISCHER & SON,
New York Fire Brick &
STATEN ISLAND
CLAY RETORT WORKS,**

Established 1845.

Office, foot of Houston Street, East River,
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The largest stock of Fire Brick of all shapes and
sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzle Patent,
and others. Fire Mortar, Ground Brick, Clay and
Sand. Superior Kaolin for Rolling Mills and Found-
ries. Stone Ware and other Fire Clay and Sand,
from my own mines at New Jersey and Staten Island,
by the cargo or otherwise.

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**Stove Linings,
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Manufacturers of

**FIRE BRICK
And Furnace Blocks
DRAIN PIPE & LAND TILE.**

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ESTABLISHED 1845.

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of reliable quality for all purposes, manufactured on
the best New Jersey Fire Clays. Also, Architectural
Terra Cotta, Fire Clay, Fire Sand, Kaolin, Ground Fire
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AND

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Manufacturers of Clay Retorts, Fire Bricks, Ga-
House and other Tile, Cupola Brick, &c. Dealers in
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Burl's Creek, New Jersey. Manufacture: Van Dyke,
Elizabeth, Richards and Partition Sts., Brooklyn, N. Y.
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and Enameled Clay Retort Works.**

ADAM WEBER, Proprietor.

Office, 633 E. 12th St., N. Y. Clay Retorts, Enameled
for Gas Houses; Retorts for burning raw bone and
re-burning bone for Bone Black. Fire Bricks, Fire
Blocks, Cupola and Range Bricks of all shapes and sizes.
The best fire clay from my own Clay Beds at Perth
Amboy, N. J.

Watson Fire Brick Manufactory

ESTABLISHED 1836.

JOHN R. WATSON, Perth Amboy, New Jersey.
Manufacturer of

FIRE BRICK,

For Rolling Mills, Blast Furnaces, Foundries,
Gas Works, Lime Kilns, Tanneries, Boller
and Grate Setting, Glass Works, &c.
FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE

HENRY MAURER,

Proprietor of the

**Excelsior Fire Brick & Clay
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BRICK AND CLAY RETORTS.
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Troy, N. Y.

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Tuyeres, Tiles, Blast Furnace Blocks, &c. Miners and
dealers in Woodbridge Fire Clay and Sand, and Staten
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Fire Brick, Tile & Furnace Blocks,

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Clay Gas Retorts,

Retort Settings,

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PHILADELPHIA.

Eighteen years' practical experience.

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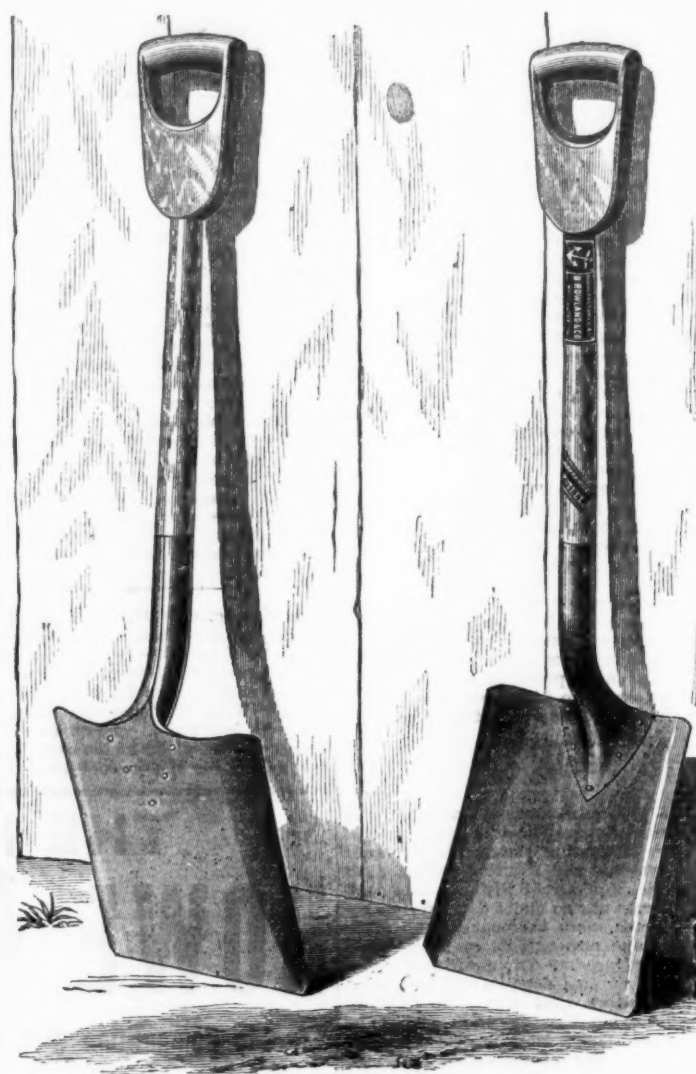
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Cutlery Manufacturers, Brass Finishers, Nicke-
lators, Jewelers, &c. Felt for Rollers and Steam
Pipes, Harness Makers, &c. Patent Black Board
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**B. ROWLAND & CO.,
PHILADELPHIA.**



B. Rowland & Co.'s Patent Riveted Shovel.

CAST STEEL.

We would particularly call the attention of the trade to the Patent B.
Rowland & Co.'s Anchor Brand Shovel, as now manufactured by us, possess-
ing as it does improvements in construction which render it the most perfect
STRAP Shovel made. In it the old style of back strap is entirely dispensed
with, and a front strap substituted, riveted and clamped firmly to the blade,
clamping the handle in the manner of a ferrule, thus obviating all danger of
tearing off strap and making a more beautiful finish front and back. These
improvements add to the appearance of the shovel, enhancing its durability
at least one-third, and warrant the assertion that all the Shovels we manu-
facture from this patent will prove the most desirable ever offered the con-
sumer.

The above advantages are also especially noticeable in our Spades and
Scoops under the same patent.

B. Rowland & Co.

CAST STEEL.

All goods of this brand (which is copyrighted) are warranted in every
respect, and we will guarantee that the following named PATENT RIVETED
Shovels and Spades will be made from the gauge of Cast Steel specified:

D Handle Square Point Shovel	13 gauge
D " Round " "	14 "
D Long Handle Round Point Shovel	15 "
D Handle Spades	11 "
D " Western Coal Shovel	15 "
D " Anthracite Coal Shovel	14 "

Gauged by Stubbs' Gauge.

B. ROWLAND & CO.,

CITY OFFICE,

27 North Fifth Street, Philadelphia, U. S. A.

Works at Frankford, Phila., U. S. A.

NEW YORK WAREHOUSE, 100 Chambers St.

strain this firm to the very utmost for the
next two months.—*Alliance Review.*

Seven combined machines and three mow-
ers in the present daily run at the Empire
Works in Akron.

We received a personal letter last week
from a Cleveland party, strongly intimating
that by proper exertion on the part of our
business men we might secure the plate-glass
manufactory which it is proposed to remove
from Lafayette, Ind., to some point near
Cleveland. This is said to be the largest
glass manufactory in the United States, and
its removal to Berea would contribute greatly
to the growth of this place, and the mere
chance of obtaining it warrants the outlay
of the requisite overtures and negotiations
on the subject.—*Berea Republican.*

The trade of Peter Gerlach & Co., saw
manufacturers, is large, and some excellent
orders are now being filled for saws from
different sections of the country.

The National Glassworks at Bellaire shut
down on Tuesday, the 19th inst., for repairs.

The Revolving Scraper Company, at Col-
umbus, have recently shipped a lot of their
revolving scrapers to their agents in Lon-
don, also samples of both scraper and bar-
rows to the Paris Exposition. These goods
are well adapted for shipment to a distance,
as they are made to fold up and pack in
nests. The company anticipate a large
trade this year.

The Cleveland Forge and Iron Company
are running their works single turn, and
have good prospects of an increase of busi-
ness in the near future.

Messrs. Taylor & Boggis, Cleveland, man-
ufacturers of light castings, are running
their works full, and have a very fair pros-
pect for largely increased business this year.

The Western Horse Shoe Company, at
Cleveland, have a fine large brick building,
and have nearly completed their prepara-
tions for vigorous operations, which they
expect to commence in a few days.

The Alice Furnace has made 33,250 tons of
metal in her career.

The Sarah Furnace, Ironton, fired up Mon-
day, the 18th inst.

The Belfont Nail Mill, at Ironton, is again
idle.

The Agricultural Implement Works of L.
Spence and that of Hoyle Brothers, of Mar-
tins Ferry, report the prospects for a prom-
ising demand during the season unusually
good and the number of machines in course
of construction greater than usual. Mr.
Spence has a contract for two large engines
for a couple of mills in Green county, Pa.,
upon which all hands in the engine shop are
busy at work.

MICHIGAN.

From the *Mining Journal* we take the fol-
lowing: The usual number of men are em-
ployed at the Republic, and it is expected
that the output will be about the same as
last year, unless the bottom drops entirely
out of the ore market. The Edwards mine
is working a force of about fifty men, and
raising about \$1,000 tons of ore per month.
These figures can, however, be more than
trebled should the outlook warrant a cor-
responding increase of the force. The new
opening at the New York mine is turning
out to be an extraordinarily rich find. They
are now taking out some as fine steel ore as
we ever saw. They are still stripping, and
until the entire vein is uncovered mining
will be carried on only on a limited scale.
It is now considered probable that work
will be resumed at the Spurr mine in the
near future. It is expected that the assignee
will be instructed to resume operations for
the benefit of the bondholders and other
creditors of the company. McComber is now
raising some excellent hematite from his new
mine near the Depot Negaunee, and is drift-
ing into the hard ore. It is now reasonably
certain that operations will be suspended at
the Michigamme mine on or about May 1st,
unless sales of ore to some considerable
amount are effected before that date. Scarcely
half the product of last year was shipped,
the balance remaining in stock at the
mine, and being considerably increased by
the past winter's work. It is not to be
expected that the company can or will con-
tinue to accumulate ore in stock piles in the
face of a depressed or falling market.

MISSOURI.

But one furnace in this State is in blast
—the Missouri—which is making 50 to 60
tons of iron per day using Crawford ore.

Midland Furnace will blow in during the
month of April.

Choteau, Harrison & Valle have started
the Laclede Rolling Mill on full time at Pitts-
burgh prices.

The Harrison Wire Works are making
some extensive alterations and improve-
ments, and in 60 days expect to double their
capacity.

The Peckham Iron Company expect to be
ready for business by April 15. They pro-
pose to make blooms directly from Iron
Mountain ore. They expect to make a
bloom especially adapted for fine qualities of
iron.

The Vulcan Iron and Steel Works of
South St. Louis, which have been idle since
last November, have no prospect of starting
up at present. A remonstrance against a
reduction of the tariff signed by 370 men
has been sent to Congress from that dis-
trict. The zinc works, the Missouri fur-
nace and the Iron Mountain Railroad ma-
chine shops are the only works that are
doing anything in South St. Louis.

ILLINOIS.

The St. Louis Bolt and Iron Company are
full of orders, and running full.

Belleville Nail Works are again at work.
Gen. Powell, the manager, is pushing the
mill to its utmost capacity, turning out
nearly 700 kegs per day.

WISCONSIN.

Operations at the Bay View Iron Works
under the North Chicago Rolling Mill Com-
pany's lease are expected to commence the
1st of May.

TENNESSEE.

The Southern Pipe and Pump Company
removed their manufactory from Chicago to
Chattanooga some few years since, on ac-
count of the superior advantages of the lat-
ter location for handling their large and
growing trade, which now extends to all

sections of the Union, except the New Eng-
land States. Their factory was carried
away by the high water of 1875, entailing
considerable loss; but the disaster induced
no thought upon the part of the company of
abandoning their business or location. Ad-
ditional machinery was at once purchased,
and the works reorganized on a larger scale
than before, and are now among the most
extensive of the kind in the United States.
The managers of the business are gentlemen
of capacity, experience and courage. They
have pushed their trade into every part of
the South, and do a large business with the
North and Northwest. They have about
one million and a half feet of poplar lumber,
besides a considerable amount of hard wood,
for valves, rods, handles, &c. They find
lumber cheaper than in the North. They
also find better rates of freight for their
product. So much in their favor are these
two latter items that they are now, and
have been for some time, supplying large
Northern pump factories with bored mate-
rial, for less than the same can be there
manufactured. The pumps completed at
the factory are finished in first-class style,
and are popular for their lasting qualities.
The capacity of the factory is 50 finished
pumps per day. The company is behind its
orders, and without special soliciting they
find ready sale for all they can produce of
bored work and finished pumps. Their ma-
terial is drawn from Tennessee, Georgia and
Alabama, and is said to be not only cheaper
but better in quality than Northern timber
will produce.

The Roane Iron Company's new steel fur-
naces and mill are progressing rapidly. The
gas producers are complete, except that a
part of the connecting pipes leading to the
furnace are to be put in position. One fur-
nace is about complete. Another furnace,
and perhaps a third, will be begun at once
when the first is done. The pumps, pipes
and crane have been finished at various fac-
tories in the North, and have been shipped.
The blooming train is being made by Mc-
Intosh, Hemphill & Co., Pittsburgh. It is
a 35-inch train, the largest blooming train
in the United States. This train will be
supplied with automatic rolling apparatus,
and will be propelled by the Corlies engine
now in use on the iron rail train. The rail
train, 21 inch rolls, is all ready to be put
in position. The rolls and housings were cast
by D. Giles & Co., Chattanooga, and will be
placed on the foundation now occupied by
the iron rail train. This train will be driven
by a Corlies engine, 42x42 inches, which is
now on the road. The fly-wheel is 34 feet
diameter and weighs 38 tons. The works
will begin melting steel about the middle or
latter part of April. They will be fully
ready to turn out steel rails by the 1st of
June, if no accident of a serious character
shall happen to the works before then. The
prospect of trade for these works is very
encouraging. All the best Southern lines
are contemplating putting down steel rails.
Many of them have already done so in part.
The prospect of securing the right kind of
ores is good; in fact the bed of gray specu-
lar the company is now working near Car-
tersville, Ga., promises everything needed.
Several hundred tons of pig have been made
of this ore as an experimental lot, and it has
already been tested in a small way, though
of course no test short of making it into
steel rails will be conclusive. On this point
Capt. Chamberlain, vice-president and su-
perintendent of the company, and a gentle-
man of experience and close observation,
anticipates no serious trouble. The Roane
will be the pioneer steel mill of the South.
Its predecessor was the successful iron rail
mill of that section.

Coal Mining in Tennessee.

The coal mines in what is commonly
known as the Coal Creek Region, in Ander-
son county, East Tennessee, are among the
most extensive in their deposits, and the
finest in quality for grate, steam and gas
purposes that have yet been developed in
the Southern coal region. The veins aver-
age about 5 feet in thickness. The coal is a
hard, bright bituminous, a very free and
bright burner. There are three companies
operating in these coals, the Black Diamond,
the Anderson County and the Knoxville
Iron Company's mine. There has been con-
siderable trouble with the labor at these
mines, the men having adopted the fashion
of striking when their labor and its product
are most seriously needed. This feature of
the business induced the iron company to
hire from the lessees of the Tennessee Peni-
tentiary a hundred convicts, whom they
placed in their works nine months ago, and
have been working none but this labor since.
There was very bitter opposition to this
action by the men employed at the other
mines, and some violence and destruction of
property ensued. This opposition, and the
form it has taken, alarms the owners of
mining property, and they would like to re-
tire from the business unless conditions
undergo a change for the better.

The output of Black Diamond mine in
1877 was 46,000 tons; that of Anderson
County Company, 12,000 tons; that of the
Knoxville Iron Company, probably about the
same as the latter.

The Iron Company are the only operators
now doing anything like a business at Coal
Creek. They work their convicts half time,
taking out 150 tons per day. The other
companies are pretty much idle. The last
winter has been so mild that the sales have
been very light.

For gas purposes these coals are highly
prized, being fully equal to the best bitumi-
nous coals of Pennsylvania. Their product
can be increased almost without limit, the
coal being very easily mined and handled.

The mines depend entirely on the Knox-
ville and Ohio Railroad, a line 40 miles long,
from Knoxville to Coal Creek.

The mines sell their coals in Georgia,
Alabama, North Carolina and Tennessee,
having practically monopolized the supply-
ing of gas coals to all cities within the
reach.

Several Howson-Godfrey puddling fur-
naces are being erected at the Erismus Iron
Works, Middlesborough. It is intended to
put the furnaces in operation in the course
of a week or two. The works were origi-
nally erected for the purpose of making iron
by the Danks process.

New York Opinion Respecting the Bankrupt Law.

The announcement that the Judiciary Committee of the House of Representatives had decided to report a bill repealing the national bankrupt law caused inquiries to be made on Monday among leading merchants, in order to ascertain their views of the probable effects of the passage of the bill upon commercial interests. This bill provides that involuntary proceedings in bankruptcy shall cease immediately after its passage, but that all voluntary proceedings shall be allowed until July 1, 1879.

Mr. H. B. Claflin said that he was in favor of the immediate and total repeal of the bankrupt act. He was strongly opposed to the clause in the bill permitting voluntary bankruptcy proceedings till the middle of next year, as that would put a premium upon bankruptcy for the next 15 months. The repeal of the law might cause hardship in some individual cases, and there would be a variety of collection laws in the different States, but anything would be better than the present act. The latter was in such a condition that amendment would be a hopeless task, and it was better to wipe it out altogether. It enabled debtors to obtain a release from their obligations too easily, and proceedings under it were much too expensive.

Mr. E. S. Jaffray was also strongly in favor of repeal, but said that the bill agreed upon by the committee was infamous. If voluntary bankruptcy proceedings were to continue, while involuntary proceedings were stopped, creditors were rendered powerless. The present law was a vehicle of fraud. It led to and protected a vast amount of dishonesty. He was one of the committee who drew up the original draft of the act, but by the time Congress had finished amending it he could scarcely recognize the bill. As it stood now, where a creditor saved one dollar by it he lost fifty dollars. In regard to the practicability of remedying its objectionable features, Mr. Jaffray said that if a good bankrupt law were passed to-day, Congress would make it a bad one next week.

Mr. Harriman, of Low, Harriman & Co., said that he favored the retention of the bankrupt law, although it had defects. It was better, with all its imperfections, than a return to a multiplicity of State laws, with the old system of preferred creditors, &c., which operated very unjustly. The customers of his firm were chiefly persons who lived in cities and did an extensive business. If one of them got into bankruptcy, his house could secure the appointment of a good assignee, and the results of the law were generally favorable. Of course, the law could be made an instrument of fraud if it was carefully studied for that purpose and deception was planned a long time in advance. For instance, a merchant came to this city from the West last year, and bought large quantities of goods, while owing heavy confidential debts to relatives. He gave notes, and had five months in which to sell his goods before any important payment would be due. By carefully evading any act of bankruptcy under the ninety-day clause, he was able to pay his relatives and other preferred creditors, while his creditors here could obtain but a small part of their claims. Still, cases like this merely proved that the law was not perfect. Under the old system, before the national bankrupt law was passed, certain large firms who did business enough to keep lawyers constantly employed in watching their claims, made it a rule never to compromise with debtors, and were usually able to get all the available property of a delinquent. The other creditors, who were "left out in the cold," had no remedy. Now there was a chance for the equitable distribution of whatever a debtor was able to pay. It was natural that some of the large jobbers should prefer the old condition of things, especially as they had many country debtors for small amounts. When any of the latter became bankrupt, the assignee might be an irresponsible person, and the expense of bankruptcy proceedings might be large in proportion to the amount involved. The jobber, therefore, might get only a small part of the bankrupt's assets, while under the old system he would probably seize the whole. The commission houses, Mr. Harriman believed, were generally in favor of the present national law, on the ground that it was much better than none.

A gentleman who has had much experience in the workings of the collection laws said he believed that the repeal of the bankrupt act would affect commercial interests very injuriously. The law, he admitted, needed amendment. It was imperfectly executed, and the cost of proceedings under it was excessive. As it was, however, it was far preferable to a variety of State laws, many of which were framed directly in the interest of the debtor class and against that of creditors. In some of the States the exemptions of property from attachment and sale for debt were so great that without a national bankrupt law it would not be safe for any New York merchant to sell a bill of goods in them. In Texas, for instance, the State law provided that 200 acres of land, not exceeding \$5000 in value at the time of its designation as a homestead, without reference to the value of improvements thereon, should not be subject to forced sale for debt, except for the purchase money. The law also exempted a great number of personal effects, which might be of high value. In Wisconsin the homestead protected by law consisted of 40 acres of land, with a house and all appurtenances, when situated outside of a city, or a quarter of an acre, with house and appurtenances, when owned and occupied by any resident of the State and situated within a city. In that State, also, the law exempted a large amount of personal property, including horses, cattle, sheep, &c., and one year's supply of food for the debtor's family and live stock. With this as the only law on the subject a man might own \$100,000 worth of property in Wisconsin, and have it so placed that a creditor could not collect a dollar of it. In Pennsylvania, under the State law, a debtor's personal property must be exhausted before his real estate could be touched, and then the creditor must wait a year if the sum in interest exceeded \$500.

In California a debt was outlawed in two years unless the creditor held an instrument under seal. These laws in Western States were designed expressly to protect their citizens from creditors in the East. An equitable national law was required to supersede such one-sided special enactments.

The bankrupt law was passed not only for this purpose, but to protect debtors from a certain class of creditors who would never relinquish a claim for less than its full amount, and would keep a victim of business reverses "under the harrow" all the rest of his life. After the panic of 1857 there were certain houses in this city which pursued this unrelenting policy, and this was among the causes of the enactment of the national law.

This gentleman said that the bankrupt law ought to be made more stringent and less costly in its operation. He thought that there ought to be three classes of discharge under the act. A first-class discharge should show integrity in the bankrupt, a second class that his integrity was questionable, and a third class that he had been guilty of fraud. If a man became bankrupt twice he would not give him a first-class discharge the second time. He also thought that a bankrupt should not be discharged until notice to all his creditors had been proved.

To illustrate the workings of the State laws before the passage of the bankrupt act, this gentleman described the case of a friend of his, a merchant in this city, who sold \$1800 worth of goods to a man in Boston and received notes for the amount, dated at Boston. Before the notes fell due the debtor became a bankrupt, but he was afterward able to pay them. When the sum was demanded, he made answer that he was not liable by reason of his discharge in bankruptcy. This proved to be the fact, simply because the notes were dated in Massachusetts, and the operations of the State law had wiped out all the debtor's Massachusetts contracts.

In November last the Chamber of Commerce unanimously adopted a memorial to Congress remonstrating against the repeal of the bankrupt law and requesting that a commission be appointed to ascertain its defects and recommend amendments. This memorial was afterward signed by a great number of mercantile firms, including many of the best-known houses in the city.—*Evening Post.*

The Use of Liquid Fuel.

In a paper read before the English Institute of Civil Engineers, it was stated by Mr. H. Aydon that apparatus specifically adapted for the combustion of liquid fuels, which comprised every class of fluid hydrocarbons, might be ranged in five classes. The leading principle of their action was either the subdivision of the liquid as spray, or by percolation through a porous bed, or by preliminary conversion into vapor—when the fuel was mixed with air, or with air and steam, by the instrumentality of jets of steam or compressed air, or it was burned simply as gas in jets. The earlier system of Mr. C. J. Richardson, in which the liquid fuel, mixed with heated air, percolated upward through a porous bed, was tried at Woolwich Dockyard, but the performance was not satisfactory, for black smoke and soot were discharged in such abundance as speedily to choke the flue tubes and stifle the draft. By a subsequent improvement, in which a mixture of steam was introduced with the fuel, a much better performance was effected—the quantity of water evaporated having been increased from 6½ pounds per pound of fuel to from 7 pounds to 18½ pounds per pound of fuel, though the formation of dense smoke was not prevented. The performance of coal under the same boiler amounted to an evaporation of 8 pounds of water per pound of coal.

The system of Messrs. Simm & Barff, in which the liquid fuel was vaporized in a retort placed in the furnace and burned in jets, was tried in 1866 on board the yacht Minnie. The quantity of oil consumed amounted to one-third only of the corresponding quantity of coal. The system was afterward tried with the addition of steam, and with better results, as the intensity of the combustion was increased and smoke was prevented.

In the fourth system, patented by the author, in conjunction with Mr. Wise and Mr. Field, in 1865, the liquid fuel was summarily vaporized by the injection of the liquid into the furnace by the instrumentality of steam, which might be superheated, the supply of air for combustion being at the same time drawn in as an induced current. By this plan the materials could be instantly and thoroughly mixed and converted into vapor or gas before ignition took place. No alteration of the ordinary furnace or grate was needed, so that either coal or oil could be used. For burning oil, the grate-bars were covered with thin firebricks and a few cinders, and the ash-pit doors were closed to keep out surplus air. In March, 1867, this method of burning liquid fuel was tried at the works of Messrs. J. C. & J. Field, South Lambeth, in a Cornish boiler of 20 or 22 horse-power, 5 feet 6 inches in diameter, with a 3-foot flue. The results of several days' experiments showed an average of 19½ pounds of water evaporated per pound of liquid fuel. The boiler previously evaporated 6½ pounds per pound of Aberdeen coal. Similar experiments with a double-flue Galway boiler, at the chemical works of Mr. Barnes, at Hackney Wick, gave a net evaporative performance of 25.3 pounds of water per pound of fuel. Experiments had been made with other boilers, in which the evaporative efficiency of the liquid fuel ranged from 1½ to 3 times that of coal. Equally good results in favor of liquid fuel were obtained from its employment under a marine boiler at Woolwich Dockyard.

The fifth system enumerated, the invention of Mr. Dorsett, in which the liquid fuel was vaporized in a separate boiler or retort, to be burned as a gas, was tried in 1868 at the chemical works of the inventor, at Deptford, and also on board the Retriever steamer. The results in favor of liquid fuel showed a reduced consumption in the ratio of 2.5 or 2.7 to 1 as compared with coal; but against this economy had to be placed

the cost of the separate generators and their furnaces, and of a force pump. The retort, too, was liable to explosion in consequence of the deposit of solid carbon within it.

The first employment of the author's system in metallurgical operations was at the Millwall Iron Works. The oil furnace was an adaptation of an old scrap iron furnace, 7 feet square and 2 feet 9 inches high, having a fire-grate 2 feet 6 inches wide and 7 feet long. It was fitted with bricks, and was used as a combustion chamber. Three oil injectors played directly upon the metal to be heated lengthwise of the furnace. In August, 1871, the results of comparative experiments showed that

The time taken to heat the furnace with coal was 6 hours.

The time taken to heat the furnace by above system (5) was 5 hours.

The time taken to heat the furnace by the author's (4) was 2 hours 6 min.

In five hours and a half—the total time occupied in making up, together with the intervals, between the charges—68½ gallons of liquid fuel were consumed, being at the rate of 12½ gallons per hour. Twenty-one piles of scraps, each of 2 cwt., were charged into the furnace, or a total of 42 cwt., while the weight of iron taken out was 37 cwt. 20 lbs., showing a loss of 4 cwt. 92 lbs., or 11½ per cent. The furnace consumed 6720 lbs. of coal in twelve hours to keep up the heat, against 1405 lbs. of liquid fuel, showing a ratio of 4½ to 1 in favor of the oil, the consumption of which was at the rate of 17 lbs. per hundredweight of iron. The loss of iron treated by coal was from 22 to 25 per cent., whereas with liquid fuel it was only 11½ per cent. by system 4 and 16½ per cent. by system 5.

The author, in 1875, proceeded to Canada to experiment on the reduction and smelting of the refractory iron ores of that country, many of which were magnetic, and contained 32 per cent. of titanic sand. The sole object of these trials was to prove that the Canadian ores could be successfully treated by means of petroleum as fuel. The experiments proceeded satisfactorily, and pig iron was readily produced from the ore; though it was found that oil fuel in smelting operations must be used in connection with an air blast under pressure. The experiments were interrupted by the severity of the weather, and not until recently had the refractory and other ores been smelted and reduced at a minimum cost by liquid fuel or native petroleum.

The results of the use of liquid fuel in Russia and other foreign countries were given in the paper, together with the conclusions of Mr. Isherwood, chief engineer of the United States Navy, on its employment in steamers.

The author made the general deduction that, although liquid fuel might be burned without the employment of steam, yet it was consumed most economically and with the best results in the presence of steam; and of course the more highly superheated the steam the better was the performance.

British Coal.

W. H. Johnson, in a paper read before the Manchester Geographical Society, makes some very interesting statements in regard to the resources and future development of the coal fields of Great Britain. Although Great Britain has no doubt developed its resources much more thoroughly than other countries, and although its coal fields could maintain its present output for 100 years, yet some of its coal deposits will be worked out long before that time. To this approaching exhaustion attention should be directed, as it has a most important bearing on the prosperity of the districts affected and the general welfare of the country. Even in the next century it will tell against the industries of Scotland and the North of England.

To begin with, take the Scotch coal field, of which the production in 1876 was 18,665,552 tons; and in 1868 was 14,709,050 tons, being an increase in eight years of 3,956,503 tons per annum.

The production is likely to be still further increased, as the coal is easily and inexpensively worked; deep pits are unknown in Scotland, and the demand for manufacturing and domestic purposes must increase with the rapid growth of the population and extension of manufactures.

We naturally ask what is the supply? The Royal Commission in their 1871 report give 9,543,000,000 tons as the quantity of available coal in Scotland. Now, after deducting what has been abstracted since that date, it is found that the present output can only be maintained 500 years. Probably in a century and a half a great diminution in the output will be apparent, which will exercise a very prejudicial effect on the prosperity of the South of Scotland.

The coal field of Northumberland and Durham is unequalled for the quality of its coke and the natural facilities which its rivers afford for the export of coal. Its annual production, 32,000,000 tons, almost equals that of the United States or Prussia, while it surpasses that of all other countries put together. In the last eight years its increase has been rapid, upwards of 1,000,000 tons per annum.

Output in 1876.....31,991,623
" 1868.....24,394,167
Increase.....7,597,456

The quantity now available is probably about the same as in Scotland, and at the present rate of production will last only some 300 years. In consequence of the great depression in the iron trade the production last year was a little less than in the previous one, though there is every probability that the output will be well maintained for many years. In 50 years this district will not be able to retain its present proud position of largest producer among the coal fields of Great Britain, and in two centuries coals may regularly be sent from Yorkshire to the iron works in Durham. The waters of the Tyne and the Wear will then no longer be darkened by fleets of colliers waiting to convey the black diamond of the North to all parts of the world, for the export trade will be gone.

The South Staffordshire coal field is already half worked out; but, lying in close proximity to other more extensive coal fields,

its iron works and manufactories can be supplied on reasonable terms; and, though its day of cheap coals is over, its industry is not threatened with a short supply of fuel for many years to come.

The coal fields of Lancashire and Cheshire can probably maintain the output for 800 years, as, besides the visible, there is a large concealed supply. Looking, however, at the vast and increasing industry of the district, any too large a supply of coal cannot be claimed.

Having considered our best-developed coal fields, an examination where the greatest future extension of mining enterprise is to be looked for is of great interest. The first is the South Wales basin, containing probably 32,000,000,000 tons, or one-fourth of the whole available supply of coal in Great Britain, its output being at present one-ninth. Abutting on the sea coast, and with convenient ports of shipment, South Wales will at no very distant time take the lead in the export trade which the Northumberland and Durham district does at present, and the era of cheap fuel will probably last longer there than in any other part of Great Britain.

Equally bright is the future of the great coal field of Yorkshire, Derbyshire and Nottinghamshire, with an available supply of 41,000,000,000 tons, or nearly one-third of the whole supply of the United Kingdom. This abundance of excellent fuel must rapidly increase the manufacturing industry and prosperity of the district.

Among the smaller coal fields those of the North Staffordshire district and Bristol probably admit of great development.

Railroad Enterprise in East Tennessee.—Parties are now engaged in surveying a line for a narrow gauge railroad from Careyville, Anderson county, Tennessee, on the Knoxville and Ohio Railway up the Powell River Valley to Cumberland Gap. This road will open to market the year round a very rich agricultural region, which now depends on the spring freshets and flatboats, and goes to market once or twice a year. The line will reach some very fine beds of brown hematite ore, and pass directly through the fine zinc mine in Union county, owned and operated by the New York Zinc Smelting Company. This excellent zinc ore has been pretty extensively mined and shipped to New York city in spite of the great drawback in the matter of transportation. The Zinc Smelting Company, the counties along the line and the railroad companies to be benefited will all aid the enterprise, and as the road is but about 20 miles long there is no good reason why it should not be in operation within the current year.

A Foreigner's Opinion of Missouri Mines.—The Joplin (Mo.) Mining News says: Mons. O. Francois, who has been in Joplin for the past few days in the interest of a French mining journal, left yesterday morning for Webb City and Carthage. Mons. Francois has visited almost every mining country on the globe in the capacity of correspondent for the journal alluded to, and

does not hesitate to say that lead can be procured in the Southwest at a shallower depth and at less expense than in any other locality in the world. He says that the Spanish miner here would consider himself fortunate in possessing the mines which our miners consider too poor to work. But then he notices a vast difference between the American and Spanish miner. Here the man who searches for lead is intelligent, and accustomed to the luxuries of life, and is looking forward to the time when he can better his condition, if he is not already wealthy. The American in most cases dresses well, lives well, devotes 18 hours out of 24 to rest, amusement and literature. The Spanish miners do not think of working less than 18 hours, and then if his day's work will procure for himself and family a meager meal he is happy. Besides, his children from eight years old and upward must also work to keep the wolf from the door. This is why Spain and some of the other foreign nations can compete with the United States in the production of lead, and is a stronger argument in favor of a high protective tariff than all the windy arguments on political economy ever delivered.

Car Wheel Manufacture at Knoxville.—The Knoxville Car Wheel Company are now, and have been for some time, making 20 wheels per day. The company own a small furnace in Carter county which furnishes the metal used—about 6 tons per day. This iron is a cold-blast charcoal, made from a mixture of brown hematite, red fossiliferous and manganese ores, beds of each of which the company own, and all lie near the furnace. Their mine of manganese is said to be excellent, containing by analysis 75 per cent. of manganese. This ore is very abundant, as are the other ores in the neighborhood. The furnace is 14 miles from Carter depot, on the East Tennessee, Virginia and Georgia Railroad, about 120 miles from Knoxville, where the company's foundry is located. This furnace was built 50 years ago, and is probably the oldest furnace in the South now in blast or capable of making iron of first quality. No other iron is used in the wheels they turn out except their own, and the reputation they have achieved shows the material to be first-class. There are now wheels in use on the Memphis and Charleston Railroad which were cast from this iron by the same company 22 years ago. They have never had a wheel to cause an accident by breaking, nor had a wheel returned to them by reason of failure in any particular. The company employ about 100 hands at the furnace and foundry, paying from \$1 to \$3 per day.

A German inventor has devised a bank-note album, with leaves of asbestos paper, for the protection of notes, checks, and valuable documents. By placing them between the asbestos leaves, especially if the book is firmly clasped, they may be kept legible, even after exposure to a fire which reduces them to cinders.

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- 4th. For their economy in construction.
- 5th. For their first-rate material and workmanship.
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From 1½ inch to 2 inches.

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STANDARD
HOLLOW AUGERS.

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Manufacturers of DAMAN STANDARD HOLLOW AUGERS.—Universally acknowledged superior to any other in the market. They have recently been improved, making them, as now offered to the trade, the most perfect tools of their kind, either in design, material or workmanship. SPOKE AND DOWEL TURNERS.—The very best as well as the cheapest. METALLIC COMBINATION PLOW PLANK.—Made of solid cast steel and of gun metal. Of an entirely new design. Can be used as Groover, Dado and Rabbit Plane, in any direction of the grain, and also as a Hatch Plane. COMMON SQUARE DOOR SPRING.—The most durable and cheapest Door Spring yet made. LEAD PIPE CUTTERS.—To cut lead pipe in any position and without chips or burrs. Please send for circulars and prices.

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CONSTANT REVISIONS AND PROMPT NOTIFICATIONS TO SUBSCRIBERS.

The April edition of the forty-second semi-annual volume of our Book of Reports is now prepared and is ready for distribution. This edition has been as thoroughly revised as that published in January, and brings the estimate of the capital and credit down three months later than that volume. It also contains new features which have never heretofore appeared in any Commercial Reports. With a desire to give our book greater intrinsic value, we have incorporated under their respective heading, a brief but concise description of the location of each and every city and village, stating if situated on a railroad (naming the same), and noting the fact, if a telegraph, post office money order, and express office, thus covering all the information desired to make it a more complete book of reference for the counting-room, as well as the most reliable Shipping Guide ever offered to the public.

While this is a new departure, it seems most appropriate to place this information in conjunction with our reports, and we are confident it will meet a want which has long been felt by the grantors of credit.

While the object of our Agency is so well understood and so thoroughly appreciated as not to require a more extended notice at this time, we particularly desire to call your attention to that important department which we have brought to a greater degree of perfection even than that of the publication of our *Book of Reports*, viz.:

DETAILED REPORTS.

For the further development of this important branch of our business, not only do our special reporters visit the various cities and villages in the district assigned each office, and carefully revise the reports already on record, writing also fully of those who have recently commenced business, but our correspondents are established in every town and hamlet, and are constantly advising us of the changes in the condition of all engaged in commercial pursuits. In addition to this, each office in the whole connection is required to transmit daily (to offices needing it) a copy of all information received by them (either from their travelers or correspondents), covering such trades as seek credit in other than local markets. By this system, thousands of reports are being constantly interchanged (the average received by the larger offices during the past year having been more than 1500 a day), the majority reaching their destination within ten days from the time of leaving the correspondents' or travelers' hands. The value of this daily reciprocity having proved so great, and been so thoroughly commended by our patrons, we feel that we have touched the keynote, and that in future we shall anticipate the wants of all who need and seek information influencing commercial credits, whether of the local trade or that in the remotest places in the United States and British Provinces.

To our Subscribers we furnish:

1. The use of two volumes of our *Book of Reports*, carefully revised, and issued four times each year, giving the name, business, estimated worth and credit of Merchants, Manufacturers and Banks in the United States and Dominion of Canada. Also, at a small additional cost, Pocket Editions of single States, for the use of Commercial Travelers.
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4. Promptly any information reported to us, impairing the credit of their customers, we having previously received a list of the same.
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Relying solely on the merits of our work, we respectfully solicit an examination of our system, with the assurance of ability to substantiate all we claim, and with the knowledge that it is worthy of your earnest consideration.

CHARLES F. CLARK, President.

New York, March, 1878.

Enterprise Champion Smoked Beef Cutter.

The Enterprise Manufacturing Co. of Philadelphia, are about to place upon the market an article which when carefully examined will no doubt commend itself to the trade. The illustration herewith shown will give a fair idea of its mode of operation. It is called the Enterprise Champion Smoked Beef Cutter. It is claimed for it that in its simplicity of construction, rapidity of execution, clean and neat work, it possesses qualities for economy of time not attained by any other machine. The feed can be regulated so as to cut from shavings as thin as tissue to slices one-eighth of an inch thick. Green (or soft) beef can be shaved equally well, the knife passing entirely through the beef or other article, slicing it off clean and clear. The knife being suspended pendulum-like, or on a pivot, it can be thrown up and sharpened whenever required without removing it from the machine; and as it comes in contact with no other substance than the beef, it will necessarily retain its keen edge a great deal longer than if it was continually striking against hard wood. The machine once adjusted requires no attention until a further supply is needed, when the feed can instantly be slipped back and another piece of beef be placed in the box.

Sheffield and American Competition.

The *Ironmonger* says: There is no more courteous class of men in the world than the cutlery manufacturers at Sheffield—if you are only careful to select the right time of day for calling upon them. You have but to make the request, and, even though it be at great personal sacrifice and incon-

venience, they will conduct you through their establishments, explain all the processes of their most interesting business, and on parting will almost beg of you to accept a handsome little souvenir of your visit.

Having seen all their surroundings, what more natural than that you should step into the street with the feeling that cutlery manufacturers in the metropolis of Hallamshire have very jolly times of it! Engage them in friendly conversation, get below the surface, and it will soon be discovered that everything is not quite so jolly as at first glance it might appear.

You are not long in their company before you find them inveighing against the ignorance and prejudice of their workmen—traits of character which have proved almost insurmountable barriers to the progress and development of the trade. Of course there are splendid exceptions to this rule, but the fact remains that the great body of the present generation of cutlers commenced work very young and without any education; they were taught to do things as their fathers and grandfathers did them, and to induce them to alter their modes of procedure is a most difficult and almost hopeless task. This is one of the most painful things with which manufacturers have to contend. They may spend any amount of time in devising improvements in a knife or other article of cutlery, but when they appeal to the men to carry them out every conceivable obstacle is thrown in the way; and when all others fail, such a price is asked for the work as effectually necessitates its withdrawal. By way of confirmation on this point, reference has only to be made to the protracted litigation between Messrs. George Wostenholme & Son and some of their workmen with respect to the "Shaw" pattern knife. Men who had made that knife declared they could earn as much by it as by making knives similar to it; but then it was a new pattern, and as such it was opposed.

The determined opposition of the workmen to the introduction of machinery to the trade—even when it was clearly to their immediate advantage—has been most unaccountable. The late Mr. George Wostenholme visited the United States several times; he went through some of the great cutlery manufacturing there; he saw the important uses to which machinery was put in them, and on his return he attempted to introduce similar machinery into his own works, but his efforts were only attended with the most partial success. The offer was made to the men to do certain work for them at one halfpenny per dozen, the existing method costing them at least threepence per dozen, and they most obstinately refused to avail themselves of the offer. Slowly, however, machinery is creeping into the cutlery workshops, as into all others, and work is now done by it that would not have been thought of a dozen years ago. The manufacturers themselves are among the first to admit that in adhering to old patterns and styles they are not altogether free from blame. When customers have wanted a change and things done differently they have been put off with one excuse or another, and the trade has remained in a more stagnant state than perhaps almost any other branch of industry. It is somewhat sweeping assertion to make, but we believe it is perfectly true, that there is scarcely an article of cutlery made in

Sheffield to-day that could not have been obtained there at any time during the last twenty years.

It is true that there is not an unlimited field for the display of educated artistic taste in the production of cutlery, but what room there is has by no means been occupied, partly because of a lack of that taste on the part of the makers, and partly because the efforts that have been made in that direction have not been appreciated as they should have been.

It is impossible to move about among the manufacturers without being impressed with the notion that they are now thoroughly aroused to the dangers by which their trade is threatened, and they are taking the most active measures to avert them. The keen and ever-increasing tide of competition from the Continent and from America is rightly estimated, and what the most active and intelligent of the manufacturers are now doing is to put themselves abreast of the times, and even to anticipate the varying wants of their customers. Their success depends almost entirely upon the men. The bad times through which we have passed have not been without their influence upon them. They are vastly more tractable than they were, and there is much less of that unreasoning opposition to the wishes and instruction of employers. To advantageously compete with foreign houses the articles must not only be good, but they must be light and graceful in form, and if they have also artistic ornamentation all the better. We have just had the pleasure of inspecting at Messrs. George Wostenholme & Sons several trays of sample razors, which they manufacture in such large numbers for the American market. They were nearly all the small hollow, round pattern; but what struck us was the exquisitely beau-



ENTERPRISE CHAMPION SMOKED BEEF CUTTER.

tiful etching on both the blades and the hafts, even on the commonest qualities. They were etched in gold and silver, and in combinations of gold and silver, in all kinds of devices. Of late years the Americans, and especially the American barbers, have become extremely fanciful about their razors, and they not only require them to be small and light, but to have some ornamentation upon them. This firm has laid itself out to meet their wants, and, if their steadily increasing trade with the States be any criterion, with complete success. What has been done by this firm with razors in the American market can be done by other firms with other descriptions of cutlery in that and in other markets, if the effort be only properly made. The question rests more with the men than with the masters. If they will throw aside their prejudices in favor of old methods, and join heartily with the masters in effecting improvements wherever possible, and at the same time maintain their old reputation for workmanship, there are long years of prosperity yet in store for the cutlery trades of Sheffield—at least, such are the opinions of those of the manufacturers who are most keenly alive to the signs of the times, and most determined to do their part toward securing that desirable result.

American Sheet Iron Jackets for Russian Locomotives.

The greatest victory yet achieved by American patent planished sheet iron is its use on the jackets of the 40 locomotives built by the Baldwin Locomotive Works for Russia. As is well known, this iron enters into competition with the well-known Russia iron for such purposes, and is in fact its only rival. That its quality is all that could be desired is strongly evidenced in this fact, for certainly such a house as the Baldwin Works would not put it on locomotives designed for Russia unless they had been thoroughly convinced, from actual experience, that it was the equal of the Russia iron.

There is, however, a statement that several journals have made in commenting upon this fact that should not pass unnoticed. The *Mining Journal* states it as follows: "The secret of manufacturing this sheet iron was stolen from Russia, and in view of this fact it is a little cheeky, to say the least, for our manufacturers to place it right under their noses in this manner."

This statement is without the least foundation. Wood's planished iron is not made in the same way as the Russia, but by an entirely different process, the invention of the senior partner of the firm of W. D. Wood & Co. and patented by him. All attempts, so far, to make iron in this country by the same process as it is made in Russia, which is no secret, have been commercial failures, the cost of manufacturing being so great as to preclude its sale for profit. Mr. Wood reaches a similar result by a different process at a much less cost, and as his iron is the equal in every respect of Russia iron, he has been able to compete with it and virtually drive it out of this market. This iron is not even claimed to be an imitation of Russia, nor is it sold on any such basis, but on its own merits, and on these alone it has won its way and shown

Cheerless Workshops.

One of our English cotemporaries remarks that a stranger who attempts for the first time to find the workshop of the average "little manufacturer" of Sheffield and Birmingham deserves pity. The individual of whom he is in quest may form one of a considerable number located in a conglomeration of buildings, grimy with smoke and dirt more than with actual age. The stranger must make his way through ruts caused by the wheels of carts and barrows, and a yard thick with mud, and after some search probably finds a narrow, dirty and badly lighted staircase. Up this he wends his way, being fortunate if there are not more than half a dozen of rickety wooden steps to climb, with one or more of the steps having been broken with constant use and never replaced. At the end of his journey the "little man" he is looking for is found in a room even more dingy, dirt-begrimed and badly ventilated than the staircase. Anyone at all accustomed to go in and out among the hundreds of working tenements of Sheffield and Birmingham will know that this is not an exaggerated picture. Now that so much attention has been paid to the hours of labor, assuredly some attention should be devoted to the places of labor, and among the numerous workshops in Sheffield and Birmingham sub-let for various trades and to various individuals, there is certainly great need for some step in this direction. Many of them are dark, crowded, dreary places, and were it not for the daily call of want, there would be no incentive to labor. We have seen many workshops in the towns named that are dark and damp, destroying the health and buoyancy of the spirits of the operatives, when a small sum perhaps would add not only warmth and light, but fill the place with pleasant surroundings. The surroundings of the place of labor have more influence upon the operative than many are aware of. Give a workman clumsy tools to work with, a rough, dirty, bench to work upon, imperfect light, scarcely elbow room, and but little care exercised respecting proper ventilation and warmth, and he will become careless, his work partaking of the character of his surroundings; he will think more of getting his wages at a certain time than of the completion of his work. A few years of this experience will spoil almost any workman, no matter how good he may be. But give him, on the contrary, good tools to work with and an airy and agreeable place in which to perform work, and he will insensibly take more pains with it than in a badly arranged room. In a pleasant room he will, of his own accord, keep his tools and work in good order and more cheerfully perform the task assigned to him. A kind of magnetic influence of the surroundings will infuse itself into the operative, and his work will partake of that and go from him stamped with the impress of the influence thus created. This applies with equal force to the workshops in connection with many ironmongers' places of business. General repairing is often carried on in rooms wretchedly lighted and ventilated. A more profuse use of lime-wash, the number of windows increased, and those cleaned oftener than once or twice a year, and better ventilation, will do much to induce the workman to take more pains in turning out satisfactory work.

Quincy Copper Mine.—The following summary of the work of the Quincy copper mine, Lake Superior, will be of interest:

Average force employed.....men	474
" number of miners....."	249
" wages of miners on con't per month.....\$	43,79
Yield of min'l per fat'm of ground broken.....lbs.	568
" of refined copper per fathom of ground broken.....lbs.	467
Total rock mined.....tons	98,916
" hoisted....."	81,587
Total stamp rock treated at rock house....."	73,250
" poor rock rejected....."	8,436
Product mineral.....lbs.	3,340,360
refined copper.....lbs.	2,720,558

The company has declared a dividend of \$5 per share or \$100,000. The stamp mill, in 266 working days, worked 75,307 tons of rock holding on an average 2.11 per cent. of copper at a total expense of 94.2 cents per ton. A diamond drill has been very successfully used for exploring the ground, proving parts of the vein which from the appearance in the drift seemed barren, to be very valuable.

St. Gotthard Tunnel.—The cost of carrying out the original plan of the new line which is to connect the railways of Germany with those of Italy by way of St. Gotthard would, according to a paper just issued from the German Chancellery, amount to 289,000,000 francs, being 102,000,000 francs in excess of the original estimate. The original scheme, which included several branch lines, has accordingly been cut down to such an extent that the first estimate will only be exceeded by 40,000,000 francs. Of this sum the governments of Germany, Italy and Switzerland have agreed to provide 25,000,000—Germany and Italy each subscribing 10,000,000 and Switzerland 5,000,000—on condition that the St. Gotthard Railway Company provides the remainder, or 12,000,000 francs. The subvention which the three governments had agreed to give on the original estimates was altogether 85,000,000 francs, and will, therefore, be increased to 113,000,000 francs, while the capital the company will have to raise will be 114,000,000 francs. These final estimates now only await the approval of the German Federal Council, which it is expected they will shortly receive.

The Belgian minister of public works has pronounced an opinion in the chamber in favor of iron sleepers for railways, and of carriages with central passages as more comfortable for the travelers and less dangerous for the ticket collectors. Last year five ticket collectors were killed and 20 wounded, owing to accidents arising from passing round the carriages for the purpose of taking the tickets.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, March 27, 1878.
The week under review has been dull in all departments of the financial markets, and there are few events of general interest to report. The money market has been firm, with rates to borrowers on call, 4 @ 6 per cent. The rate on prime business paper is 4 1/2 @ 6 per cent.

The gold market has been without important feature, and the fluctuations have been very slight. The following table shows the daily range of the premium:

	Highest.	Lowest.
Thursday	101 1/4	101
Friday	101 1/4	101
Saturday	101 1/4	101 1/4
Monday	101 1/4	101 1/4
Tuesday	101 1/4	101
Wednesday	101 1/4	101

The bond market has been steady and strong for Governments, notwithstanding the continued importations. These had the effect of advancing sterling exchange to 4.89 1/2 for demand bills, and to 4.87 1/2 for sixty-day bills. With bills not obtainable below these rates gold would be exported, but the actual rates yet rule a little below the shipping point. The government bonds imported have been in part distributed, but most of them have been deposited in banks and money borrowed on them.

Railroad bonds have been fairly active at slightly higher quotations.

The stock market has been irregular, but moderately active, with principal dealings in Western Union, Lake Shore, D. L. & W., St. Paul, Pacific Mail and Northwest. We give below the closing quotations of active shares.

The weekly statement of the New York banks shows a decrease in total reserve of \$578,900 and an increase in surplus reserve of \$207,750, the latter now being \$16,308,575. The statement is notable for the fact that it shows that the New York banks have a little over \$10,000,000 more gold than they have legal-tender notes. The gold average from this time forward ought to be a falling one, as we are near to the specie shipping point, and as the Treasury will probably take in more gold than it will pay out until July.

The following is a comparison of the bank averages of the last two weeks:

	March 16.	March 23.	Differences.
Loans	\$242,978,900	\$241,566,700	Dec. \$1,412,200
Specie	\$39,545,500	\$39,687,500	Inc. 142,000
Legal tenders	\$30,326,000	\$29,605,700	Dec. 720,300
Deposits	\$215,085,100	\$211,938,500	Dec. 3,146,600
Circulation	\$19,916,700	\$19,906,100	Dec. 10,600

The following were the foreign trade movements for the week:

	Imports.	Exports.
For week ended March 23:		
Total for week.	\$7,610,582	\$7,638,271
Prev. reported.	\$4,187,632	\$6,849,742
Since Jan. 1.	\$79,798,214	\$76,487,995

Included in the imports of general merchandise were articles valued as follows:

	Quantity.	Value.
Brass goods	24	\$2,756
Bronzes	10	2,410
Chains and anchors	37	1,418
Copper	3	3,283
Cutlery	59	21,620
Guns	10	10,833
Hardware	37	2,558
Iron, pig, tons	148	3,106
Iron ore, tons	34	589
Iron, other, tons	16,000	16,000
Metal goods	189	21,140
Nails	2	8,845
Needles	2	8,845
Platina	1	981
Per. caps.	17	3,077
Saddlery	2	407
Steel	13	13,287
Spelter	1	1,464
Silverware	1	133
Tin, bxs.	13	66,943
Tin, 2nd slabs	3	3,735
Wire	1	3,338
Zinc	24	1,293

For week ended March 26:

	Imports.	Exports.
For the week.	\$4,449,173	\$5,058,107
Prev. reported.	\$4,452,290	\$5,700,000
Since Jan. 1.	\$54,901,453	\$60,652,109

Included in the imports of general merchandise were articles valued as follows:

	Quantity.	Value.
Brass goods	24	\$2,756
Bronzes	10	2,410
Chains and anchors	37	1,418
Copper	3	3,283
Cutlery	59	21,620
Guns	10	10,833
Hardware	37	2,558
Iron, pig, tons	148	3,106
Iron ore, tons	34	589
Iron, other, tons	16,000	16,000
Metal goods	189	21,140
Nails	2	8,845
Needles	2	8,845
Platina	1	981
Per. caps.	17	3,077
Saddlery	2	407
Steel	13	13,287
Spelter	1	1,464
Silverware	1	133
Tin, bxs.	13	66,943
Tin, 2nd slabs	3	3,735
Wire	1	3,338
Zinc	24	1,293

For week ended March 23:

	Imports.	Exports.
Total for week.	\$168,700	\$444,955
Previously reported.		
Total since Jan. 1, 1878.	\$2,613,655	\$3,343,605
Same time in 1877.	11,630,959	11,630,959
Same time in 1876.	25,686,346	25,686,346
Same time in 1875.	7,330,874	7,330,874
Same time in 1874.	13,320,396	13,320,396
Same time in 1873.	4,613,385	4,613,385

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. Currency 6's	118 1/4	118 1/2
U. S. 6's 1881 registered	107	107 1/2
U. S. 6's 1881 coupon	107	107 1/2
U. S. 6's 1885 new reg.	104 1/4	104 1/2
U. S. 6's 1885 cou.	104 1/4	104 1/2
U. S. 6's 1887 reg.	107 1/4	107 1/2
U. S. 6's 1887 cou.	107 1/4	107 1/2
U. S. 6's 1888 reg.	107 1/4	107 1/2
U. S. 6's 1888 cou.	107 1/4	107 1/2
U. S. 10-40 reg.	105 1/4	105 1/2
U. S. 10-40 coupon	105 1/4	105 1/2
U. S. 10-40 1881 registered	104 1/4	104 1/2
U. S. 4 1/2's 1881 registered	103	103 1/2
U. S. 4 1/2's 1881 coupon	103	103 1/2
U. S. 4 1/2's 1887 registered	100 1/2	100 1/2
U. S. 4 1/2's 1887 coupon	100 1/2	100 1/2

The following were the closing quotations of active shares:

	Bid.	Asked.
Atlantic and Pacific Telegraph	18 1/4	18 1/2
Chicago and Northwest	45	45 1/2
Chicago, Rock Island and Pacific	71	71 1/2
Chicago, Bur. and Quincy	101	101 1/2
Col. and Indiana Central	8 1/4	8 1/2
Clev. Col. and Ind.	97 1/2	97 3/4
Cleveland and Pittsburgh	73 1/4	73 1/2
Chicago and Alton	71 1/4	71 1/2
Consolidation Coal	25	25 1/2
Canton	13 1/2	13 3/4
Delaware, Lack. and Western	32 1/2	32 3/4
Delaware and Hudson Canal	101 1/4	101 1/2
Express-Adams	101 1/4	101 1/2
" American	48 1/4	48 1/2
" United States	30	30 1/2
Wells, Fargo & Co.	87 1/4	87 1/2
Erie	10 1/4	10 1/2
" Pref.	93 1/4	93 1/2

Harlem	148 1/4	149 1/4
Hannibal and St. Joseph	11 1/4	11 1/2
Illinois Central	25 1/4	25 1/2
Kansas Pacific	8 1/4	8 1/2
Lake Shore	64 1/4	64 1/2
Michigan Central	65 1/4	65 1/2
Morris and Essex	75	75 1/2
Milwaukee and St. Paul	42 1/4	42 1/2
Mariposa	1 1/4	1 1/2
New York Central	106 1/4	106 1/2
New Jersey Central	14 1/4	14 1/2
New Jersey Southern	3 1/4	3 1/2
Ohio and Mississippi	18 1/4	18 1/2
Pacific Mail	185 1/4	185 1/2
Panama	125	125 1/2
Pittsburgh and Fort Wayne	90	90 1/2
Quicksilver	17	17 1/2
St. Louis and Iron Mountain	30 1/4	30 1/2
St. Louis Kansas City Northern	4 1/4	4 1/2
Toledo, Wabash and Western	17 1/4	17 1/2
Union Pacific	69 1/4	69 1/2
Western Union Telegraph	79 1/4	79 1/2

GENERAL HARDWARE.

Although the volume of business is far from satisfactory, still it is pleasant to note a slight improvement over the previous week. Letter orders are reported more abundant and travelers speak more hopefully with the more settled condition of the weather.

The demand for Nails continues light, but prices, so far as we can hear, are fully sustained. We continue to quote rod. to 60d., \$2.50, net.

At a meeting of the Western Nail Association, held in Pittsburgh to-day, it was agreed to further curtail production by shutting down the mills for two weeks in April.

The Table Cutlery Manufacturers' Association of the United States held a meeting in this city on the 26th inst., at which every establishment in the association was represented. The existing lists were confirmed, and the only changes adopted were in the terms of sale, which will be found in their circular which we print below, and which will be issued under date of April 1. The following circular explaining the future action of the association in the matter of insolvents, will be read with interest by the trade generally:

[Circular No. 4.]
Office of the
TABLE CUTLERY MANUFACTURERS' ASSOCIATION
OF THE UNITED STATES,
38 CHAMBERS STREET,
NEW YORK, April 1, 1878.

At a regular meeting of the Table Cutlery Manufacturers' Association of the United States, held March 26, 1878, the following terms of sale were adopted:

Limit of credit, 60 days.
Cash within 10 days, 4 per cent. discount.
No discount allowed after 30 days.

All invoices to date from time of shipment and time to count from date of invoice.

LANDERS, FRARY & CLARK,
MERIDEN CUTLERY CO.,
JOHN RUSSELL CUTLERY CO.,
AMERICAN CUTLERY CO.,
LAMSON & GOODNOW MFG. CO.,
BEAVER FALLS CUTLERY CO.

[Circular No. 5.]
At a regular meeting of the Table Cutlery Manufacturers' Association, of the United States, held at New York, March 26, 1878, the following resolutions were adopted:

Resolved, That we view with alarm not only the increased number of failures throughout the country, but more especially the ease with which compromises and settlements are effected, enabling the bankrupt debtor to ruinously compete with his neighbor who pays 100 cents on the dollar. In justice therefore to every solvent concern,

Resolved, That from this date we will not consent to the settlement of any debt due us, for less than 100 cents on the dollar—to enable the debtor to continue in business, except in case of absolute misfortune which could not have been foreseen or prevented. All such cases to be referred to our Executive Committee, whose decision shall be final. In cases where we are forced by composition in bankruptcy or otherwise to receive less than 100 cents on the dollar, we agree not to sell to such parties except for cash.

LANDERS, FRARY & CLARK,
MERIDEN CUTLERY CO.,
JOHN RUSSELL CUTLERY CO.,
AMERICAN CUTLERY CO.,
LAMSON & GOODNOW MFG. CO.,
BEAVER FALLS CUTLERY CO.

The Revolving Scraper Company of Columbus, Ohio, have issued the following price list and discounts for their specialties. They have also issued a handsomely illustrated pamphlet showing their Automatic Revolving Scrapers in operation, Barrows of various patterns, Road or Grading Plows, &c. :

REVOLVING SCRAPER COMPANY OF COLUMBUS, OHIO,
DISCOUNT SHEET FOR 1878.

Doty's Automatic Revolving Scrapers.
30 Inch Iron Bottom, each.....\$16.50
30 " " Steel.....18.00
30 " " ".....20.00

Discount 25 per cent.
Road or Contractor's Plow, each.....\$30.00
Mammoth Hardpan R. Plow, each.....66.00

Discount 25 per cent.
Jacob's Patent Barrows.....Per doz. net.

Railroad or Canal.....30.00
Ore or Mortar.....30.00
Wharf or Oyster.....33.00
Stone, bent handles.....42.00
Stone, straight.....50.00
Stone, light, bottom not strapped.....22.00
Farm or Garden, No. 4, large size.....60.00
Farm or Garden, No. 3, medium.....54.00

Terms: 60 days from date of shipment; payable here in bankable funds, or New York exchange; subject to sight draft, without notice, if not paid at the expiration of the time stated. Bills of lading accompany all invoices, and we have contracts with the railroad companies to all principal points at special rates of freight.

The Enterprise Manufacturing Company of Philadelphia, Pa., have issued in convenient form an illustrated catalogue of their hardware specialties, in which they show a fine assortment of Cold-handle Double-pointed Smoothing Irons, Fruit and Jelly

Presses, Coffee, Spice and Drug Mills, Measuring Faucets, Meat Cutters, Bung-hole Bore, &c.

Henry L. Butler, No. 103 Chambers street, quotes the "Cottage Fly-Trap" at \$6 per dozen, less discount 25 per cent. to the trade. This Trap, which was first introduced in this market about two years ago, has met with great favor by the trade, and is in reality a good Fly-Trap. It is simple in its construction, and contains nothing that is liable to get out of order. The Traps are put up in boxes of one dozen.

We have received the following circulars which explain themselves:

PHILADELPHIA, March 20, 1878.
To the Hardware Trade: You are hereby notified that on and after this date the list price of our Patent Measuring Faucet, will be reduced from \$42 per dozen to \$36 per dozen.

ENTERPRISE MANUFACTURING CO.

NEW YORK, March 26, 1878.
DEAR SIR—We have this day removed our New York office from 82 Chambers street to 84 and 86 Chambers street, and have arranged with the Wiebusch & Hilger Hardware Co. to hereafter represent us in New York. For the convenience of our friends, they will have a complete stock of our goods at an early day. Orders may be sent to the Wiebusch & Hilger Hardware Co., or direct to factory, and will receive prompt and careful attention.

Respectfully yours,
FRARY CUTLERY COMPANY,
JAMES D. FRARY, Pres.

Office of the MCKEESPORT IRON WORKS,
No. 111 Water street,
PITTSBURGH, March 15, 1878.

DEAR SIR: In offering our reduced prices, permit us to submit for your consideration a few facts that have been demonstrated since the introduction of our Patent Planished Sheet Iron, in 1873.

By using the very best Charcoal Bloom Iron, the employment of experienced workmen, and the exercise of great care in its manufacture, we produce an Iron handsome in appearance than the imported Russia Iron, and equal to it in durability and working qualities. This is acknowledged by all unprejudiced persons who use it, and is indicated by the following resolution of the National Association of Stove Manufacturers, at their meeting in New York, Jan. 16, 1878:

"Resolved, That we consider it the duty of all American manufacturers to bring into their consumption, as much as possible, home products, especially when they can procure them at a reduced cost and of equal quality compared with foreign. We therefore take pleasure, as an association of American manufacturers, in recommending to the use of stove makers throughout the country, American Planished Iron, at the same time complimenting the manufacturers (W. D. Wood & Co., Pittsburgh, Pa.) upon their success in producing an article of such good quality and beauty of finish."

We make all sizes up to 72 inches long. Our standard size is 60 inches long by 28 inches wide, which makes, without waste, three joints of 6-inch pipe.

The presence of the Planished Iron in the market prevents the demand of exorbitant prices for the imported article, and notwithstanding the unprecedentedly low prices at which Russia Iron has been offered in the past season, our sales have been constantly increasing, and were greater this year than any preceding one.

Price.—A, or first quality, 10 1/2 cents per pound; B, or second quality, 9 1/2 cents per pound.

Terms.—Net cash within 30 days from date of invoice, delivered f. o. b. cars in Pittsburgh.

To secure lowest rates of freight, we will in all cases ship at owner's risk unless otherwise ordered, and for security all Planished Iron will be packed in our new patent iron cases.

W. D. Wood & Co.

We invite the attention of our foreign subscribers to the advertisement of S. H. Jennings, of Deep River, Conn., which will be found among "Special Notices" on the opposite page. Mr. Jennings has had the entire charge of the sale of Russell Jennings' Patent Extension Lip Auger Bits since 1866, and has gained considerable experience as Export Factor, being, as will be seen by his advertisement, actively engaged in this business. We noticed his book of "Combination Discount Tables" on page 18 of our issue of February 21. Our readers will see from his advertisements since that time, and especially this week, that our views of the book are substantiated by well-known firms, both in the States and Canada. We are pleased to learn that he is receiving orders from all parts of the United States for this work.

IRON.

American Pig.—We cannot report the slightest improvement in the condition of the iron market this week. The only business transacted since our last writing has been in small parcels for early delivery. In the present condition of the Coal trade makers of Pig Iron decline booking contracts for future delivery based on ruling quotations. We quote Foundry No. 1, \$18 @ \$18.50; Foundry No. 2, \$17 @ \$17.50; Gray Forge, \$16 @ \$16.50.

Scotch Pig.—In this branch of the trade the transactions have been limited to a small retail business, the aggregate of which is not worthy of mention. We quote Glengarnock, \$25; Eglinton, \$23.50, and Coltness, \$25.50 @ \$26.

Rails.—Some small lots of Steel Rails have been sold during the week at prices which have not transpired; for Iron there is little or no demand, the trifling difference in present quotations of Iron and Steel Rails being altogether favorable to the latter. We quote Steel Rails \$43 @ \$44, and Iron, at mill, \$32 @ \$37, according to quality, terms of payment, &c.

Old Rails.—In the absence of business we continue our quotation of \$18 @ \$19, which is the nominal price here.

Scrap.—We quote No. 1 Wrought from yard \$22.

METALS.

Copper.—Sales have amounted for the week to 250,000 to 300,000 pounds Lake Superior at 16 1/2¢ @ 17 1/4¢, and the market now closes firmer at 17 1/2¢ @ 17 3/4¢ for Lake, and 17 1/4¢, nominally, for Baltimore. There are no sales reported of futures, nor is there any price named for them. The position of Copper on this side is strengthening. During the winter season just ended the overland shipments from Lake Superior amounted to but 1,500,000 pounds, whereas last year during the corresponding period there were shipped thence this way altogether some 6,000,000 pounds. Meanwhile we have shipped to Europe 1,750,000 pounds, or 250,000 pounds in excess of our receipts. The present stock here is estimated at 2,500,000 to 3,000,000, representing merely enough to cover the consumption of a single month. As for further supplies from Lake Superior, we hear that the first steamer will leave Buffalo for the Lake only about May 1 next, and we cannot in any event expect new arrivals here before the 10th or 15th May. The logical consequence is that there are now but few sellers willing to accept 17¢. As per cable, London remains steady, with Best Selected at £71, while Chili Bars have given way 10¢, now being quoted £64. The manufacturers of Copper and Yellow Metal meet with only moderate attention, but prices are supported at the combination rates. English Yellow Metal Sheathing is lower, now 15¢, currency, in bond; at the easier price there is an active demand. We quote: New Sheathing Copper, 26¢; Braziers, 28¢, and Bolts, 28¢; Yellow Metal Sheathing, 20¢; Yellow Metal Bolts, 25¢, and English Yellow Metal Sheathing, 15¢ in bond.

Tin.—The market is depressed and scarcely anything is transpiring in the metal just at present. From a statistical point of view, so far as this side is concerned, the immediate future, it is true, seems reassuring enough, but the spring demand not yet manifesting itself, statistics go for nothing. We quote in large lines, gold, Straits, 14 1/2¢ @ 14 3/4¢; English Refined, 14 1/2¢; Common ditto, 14 1/4¢; and Banca, 17 1/2¢, all gold. The foreign markets remain sustained; as per cable, Straits at London, is quoted £64; at Singapore, \$18.50 per picul, and Banca at Amsterdam, 41 guilders the 50 kilos. The January shipments from the Straits to the United States have been 8217 piculs, against 200 last year; 4605 in January, 1876; 6895 in 1875; 5133 in 1874; 3572 in 1873; 3424 in 1872; 2753 in 1871; and 1355 in 1870. Production in the Straits in 1875, 251,000 piculs; in 1876, 220,000 do., and in 1877, 210,000 do., showing a continued and a very considerable reduction in the output of the mines. From England we have the following by mail, dated March 14: "The improvement reported in our last continued till within the last day or two. Smelters are fairly booked, and not being in immediate want of orders, remain firm at £60 for L. and Ingots, and £70 for Bars. Straits and Australian were done yesterday at £64. 5/ spot, and £64. 10/ forward, 5/ below late price." Tin Plates.—The tendency remains a drooping one, both here and as we hear by cable, in England. Dealings here are but moderate in extent. We quote in gold, per box, ordinary brands, large lots: Charcoal Bright, \$5.87 1/2 @ \$6.25; ditto Ternes, \$5.75 @ \$6; Coke Tin, \$5.12 1/2 @ \$5.37 1/2, and ditto Ternes, \$5.12 1/2 @ \$5.25. Under date 14th inst. they write from Liverpool to the following effect: "We have again been able to reduce prices of a few brands where order books are running down, and the trade is very quiet for all classes of plates. Charcoal Tins of fair quality are procurable at 18 1/3 @ 18 1/6 for half and third cross specifications; Ternes, 17 1/6 @ 17 1/9 for all Common; Coke Tins, B. V. grade, are freely offering at 16 1/3; and can in some cases be had for 16; Ternes are more firmly held at from 15 @ 15 1/3."

Lead.—Toward the close of last week there were sold

COAL.

The small amount of Coal disposed of at yesterday's sale, and the fact that a rise in prices had been promised for April, induced a rise in the price at the auction. This has resulted in a considerably better feeling in the trade. Some dealers report a considerable improvement in business for the past few weeks. The manufacturers, however, are said to be pretty well stocked up at the present time, although they are reported as coming into the market quite freely of late. The following is the report of the Coal sale by the Delaware, Lackawanna and Western Railroad Company, for which we are indebted to Mr. F. E. Savard. The amount of Coal disposed of was 40,000 tons, deliverable during the month of April. The prices were as follows:

5,000 tons Steamer sold at..... \$3.25 @ 3.50
5,000 tons Grate sold at..... 3.20 @ 3.25
5,000 tons Egg sold at..... 3.40 @ 3.45
20,000 tons Stove sold at..... 3.65 @ 3.75
5,000 tons Chestnut sold at..... 3.15 @ 3.20

The following is a comparison with previous sales this year:

Size.	Jan. 30.	Feb. 27.	March 27.
Steamer.....	\$3.10	\$3.15	\$3.25
Grate.....	3.12	3.07	3.21
Egg.....	3.14	3.15	3.40
Stove.....	3.57	3.55	3.60
Chestnut.....	3.11	3.05	3.18
Pea.....	2.10	2.12	2.15

Since the sale the Lehigh prices are quoted at \$4 for Lump, \$3.75 for Broken and Egg, \$3.90 for Stove and \$3.25 for Chestnut. The Pennsylvania Coal Co. quote \$3.35 for Lump, Steamer and Broken, \$3.45 for Egg, \$3.75 for Stove, and Chestnut, \$3.10. Wilkesbarre, &c., quote \$3.50 for the larger sizes, and \$3.60 for Egg, \$3.90 for Stove, and Chestnut, \$3.20. This increase in the prices is quite likely to turn the attention of manufacturers again toward Bituminous Coal.

OLD METALS, PAPER STOCK, &c.

The Old Metal market still continues very quiet. Copper, Brass, Lead and Yellow Metal are in very little request, and the prospect of lower rates deter many from buying. Composition and Wrought Scrap is taken to some extent, but consumers are not disposed to anticipate future wants. The Rag and Paper Stock market is still laboring under a season of dullness, and there is no strength to quotations.

The purchasing prices offered by dealers for Old Metals are as follows:

	per lb.	per c.	per ton.
Copper, heavy.....	\$0.10	10	20
Copper, bottom.....	0.08	8	16
Yellow Metal.....	0.08	8	16
Brass, heavy.....	0.08	8	16
Brass, light.....	0.07	7	14
Composition, heavy.....	0.05	5	10
Lead, solid.....	0.04	4	8
Tea Lead.....	0.03	3	6
Zinc.....	0.03	3	6
Pewter, No. 1.....	0.02	2	4
Pewter, No. 2.....	0.01	1	2
Wrought Iron.....	17.00	1700	1700
Light do.....	11.00	1100	1100
Stove Plate.....	9.50	950	950
Machinery do.....	11.00	1100	1100
Grate Bars.....	5.00	500	500

The prices current for Rags, &c., are as follows:

	per lb.	per c.	per ton.
Canvas, Linen.....	3 c.	30	300
" Cotton, No. 1.....	5 1/2 c.	55	550
" No. 2.....	5 c.	50	500
White, No. 1.....	4 1/2 c.	45	450
" No. 2.....	4 c.	40	400
Seconds.....	2 c.	20	200
Mixed, Woolen.....	2 c.	20	200
Soft, do.....	5 1/2 c.	55	550
Gunny bagging.....	3 c.	30	300
Jute butts.....	2 1/2 c.	25	250
Kentucky bagging.....	3 c.	30	300
Book Stock.....	2 1/2 c.	25	250
Newspaper Stock.....	2 c.	20	200
Waste Paper and Scraps.....	1 c.	10	100
Kentucky Bale Rope.....	4 c.	40	400
Oakum Junk, No. 1.....	4 1/2 c.	45	450
Tarred Shaking.....	3 c.	30	300
Grass Rope.....	1 c.	10	100

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St., Philadelphia, March 26, 1878.

We still have to report business in a dull and unsatisfactory condition, and nothing in view upon which to base predictions, favorable or otherwise. Values seem to be pretty well established, and it is believed that there will be no more shrinkage, but for some reason or other trade drags along slowly, and a very despondent tone prevails throughout all branches of business. Some large transactions in Iron are reported, but without imparting strength to the market.

As a matter of interest to the Iron trade, we have pleasure in announcing that Capt. J. F. Bailey, who for the past 11 years has been connected with A. & P. Roberts & Co., of the Pencoyd Iron Works, has moved into the office lately occupied by the Pennsylvania Steel Company, 216 South Fourth street, Philadelphia. In resigning his position as business manager, Capt. Bailey had in view a wider and more extended field of operation than was possible while closely confined to the office. Capt. Bailey is now connected as follows: President of the Jersey City Car Wheel Manufacturing Company; purchasing and sales agent for A. & P. Roberts & Co., and agent for Atkins Bros., of Pottsville, for the sale of bridge materials, &c.

Pig Iron.—The market during the week has shown no essential change, and business is still dull, heavy and depressed. The condition of producers is becoming more onerous, and without any immediate prospect of relief. The advance in coal since the first of the year has been equal to 70¢ per ton increase in the cost of production, while there has been no improvement whatever in the price of Iron. It is understood that there will be another advance in coal on the 1st of April, but from present indications there will be no corresponding advance in the price of Iron. Concessions of course are equally out of the question, but sellers appear to be willing to enter orders freely at current rates. Buyers are making offers or summer deliveries at about 50¢ reduction, but we cannot learn that any orders of that character have been accepted. A fair amount of business has been done in small lots, including nearly all classes of buyers, and we are also aware of heavy orders having been placed upon terms held strictly private. Pipe manufacturers have again been in the market for lots of 1000 to 2000 tons each, and two lots of upward of 5000 tons each for a different class of trade were also placed three or four days ago. The feeling throughout the trade, however, is exceedingly gloomy, and it is likely that production will have to be curtailed, as it is im-

possible to continue business at the present unremunerative prices. We quote: No. 1 Foundry, \$18.50 @ \$19; No. 2 do., \$17 @ \$17.50; Gray Forge, \$16.50 @ \$18; Mottled, \$15.50 @ \$16. Sales during the week make a total of nearly 20,000 tons.

Blooms.—The market is dull and nominal. We quote as follows: Sunken Scrap Blooms (2464 lb), \$42 @ \$45; Northern Ore Blooms (2240 lb), \$37 @ \$39; best quality Charcoal Billets (2240 lb) for wire and steel purposes, \$50 @ \$55; Bars, do., \$65 @ \$67.50; Sheet Iron Blooms, cornered (2464 lb), \$60 @ \$62.50; Cold-blast Charcoal Plate Blooms, \$55 @ \$57.50; run-out Anthracite, \$50 @ \$52.50.

Muck Bar.—The market continues in much the same condition as last week, and sales are in small lots. We quote: Soapstone, \$30; Boiled on Ore, \$33; extra quality for Hoops and Rods, \$35—all Philadelphia delivery.

Plate and Tank Iron.—There has been a little more activity during the past week, chiefly for lots of from 10 to 30 tons each, giving somewhat more life to business for the time being. There are no inquiries for large lots, however, and there is nothing in the immediate outlook of a very encouraging nature. Prices are nominally unchanged, but there is a weak feeling, and buyers of large lots would not doubt obtain concessions. We quote: Common Plates, 2 3/8 @ 2 1/2; Tank Iron, 2 3/8 @ 2 1/2; C. No. 1, 2 1/4 @ 2 1/2; Shell Iron, 2 1/2 @ 2 1/2; Flange Iron, 3 1/2 @ 4; Solid Fire Box, 4 1/2 @ 5; and Best Bloom, 5 1/2 @ 6.

Sheet Iron.—The market continues in the same dull and inanimate condition as noted in our late reports. One of the mills in this vicinity has been temporarily closed two weeks for repairs, and another closed on Saturday for the same purpose. It is quite likely that they may remain closed for some time unless business improves. Manufacturers are carrying pretty heavy stocks, and are not disposed to increase them to any great extent unless there is some better prospect of a demand than can be seen at present. Prices are very weak, and large concessions would be made to buyers of good sized lots. We quote jobbing lots: Refined Sheet Iron, No. 26 to 28, 3 1/2 @ 3 7/8; No. 22 to 24, 3 1/2 @ 3 5/8; No. 16 to 21, 3 1/2 @ 3 3/8; Best Bloom Sheets, No. 26 to 28, 5 1/2 @ 5 5/8; No. 22 to 24, 5 1/2 @ 5 3/8; No. 16 to 21, 4 1/2 @ 4 5/8; Common Red Plates, 5 1/2 to 18, 2 1/2 @ 2 5/8; Refined Plates or Blue Annealed, 5 1/2 to 18, 2 1/2 @ 2 7/8; American, R. G., 5 1/2 to 18, 3 1/2 @ 3 3/8; Best Bloom, 5 1/2 to 18, 4 1/2 @ 4 5/8; 5 1/2; Philadelphia Russia, 7 1/2 @ 7 5/8; A. Patent Flange, 10 1/2 @ 11; B. Patent Flange, 9 1/2 @ 10; Bloom Galvanized, 40%; Refined Galvanized, 50%.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, March 26, 1878.

The most remarkable event of the past week was the very decided change in the weather. Sunday night was, with one or two exceptions, as cold a night as we had during the winter, and the peach crop in this section of the country will be very light as the buds were badly frozen. General business is backward, but it is improving, nevertheless, and the outlook in some respects is more encouraging. Manufacturers very generally report that orders have commenced to come forward more freely. The shipments, especially by river, have been quite heavy within the past few days, and but for the very small margins for profit, there would not be so much room for complaint.

The manufacturing interests of Pittsburgh are suffering from various causes, chief among which are railroad discrimination and excessive city taxation. Taxes have become so oppressive that manufacturers are very much discouraged. There is no inducement on their part to expand, and any new companies requiring new works will no doubt make it a point to get outside of the city limits to escape city taxes. Moreover, what is still worse, there is no prospect of any immediate reduction, as a heavy debt has been contracted, and it will require years to meet principal and interest. Then, as already intimated, railroad discrimination has been a very serious drawback to Pittsburgh for years, and there is no doubt but this alone has diverted a good deal of trade from here. Competing points, both East and West, have had a very decided advantage over her in this important respect, and it is not strange, therefore, that the feeling here against the management of the railroads is decidedly hostile. However, notwithstanding the great disadvantages with which she has had to contend, Pittsburgh is not dead by any means, and she will continue to be the leading manufacturing city of the country, or, as she is appropriately termed, the "Birmingham of America."

Pig Iron.—There has been but little change in the situation during the past week; business continues dull, and the producing interest the market is in a more unsatisfactory condition now than it has been at any time since the panic. Prices continue weak, and they are lower now than they have been yet, having declined from \$1.50 to \$2 per ton since the 1st of the present year, with little or no reduction in the cost of production. While it is scarcely possible for prices to go any lower, in view of the past, there is no confidence in the future, and buyers continue to buy only as their immediate wants require. If there were any animation in the market in its present condition, however, a reaction would soon set in, as stocks both in first and second hands are very much reduced, as is also the production. A very large percentage of the furnaces not only here and at those points tributary to this market, but throughout the country, are out of blast, and unless there is an improvement those now in blast will be compelled to blow out, as there is a limit to everything, and the descending attitude of the Pig Iron will be checked up some of these days, and it may come before it is looked for. Just as soon as good evidence that a reaction is at hand, a largely increased demand is certain to follow, as consumers have no stock, and they will then want to fill up their empty yards. Eastern Coke Irons are still quot-

able at \$17 @ \$17.50, 4 mos., for Gray Forge, and Bituminous Coal Smelted at \$18 @ \$18.50, 4 mos., for White and Mottled Red-short, and \$19 @ \$19.50, 4 mos., for open Gray Red-short, the latter an outside figure. Anthracite Foundry Iron is selling at \$20 @ \$20.50, 4 mos., for No. 2, and \$21 @ \$21.50 for No. 1. Hanging Rock Charcoal continues quiet and unchanged. Sale of 200 tons Eastern Cold-blast at \$27, cash.

Manufactured Iron.—There is an increasing demand, and while the trade is backward and but few, if any, of the mills are pressed with orders, notwithstanding they are only working single turn, the outlook, so far as business is concerned, is better, but the prospect for an early improvement in prices is not very encouraging. While it is alleged at some points that the agreement in regard to the limitation of production is not being honestly adhered to, no such changes are made hereabouts, and it strikes your correspondent that the best thing to be done under existing circumstances is to continue the arrangement 30 or even 60 days beyond the time agreed upon. With an increased consumption and no increase in the production there would be some chance to obtain better prices, but with an increased production, thereby causing an accumulation of stock, prices would be much more likely to decline than advance. Merchant Bars still quotable at 1.70¢ @ 1.80¢, 60 days, for good stock; Sheet may be quoted upon a basis of 2.75¢ @ 2.85¢ for No. 24; Hoop, 2.50¢ @ 2.75¢, rates; Tank, 2 1/2¢ @ 2 3/4¢. Oil Barrel Hoop Iron is now quoted at 2.70¢ with, so it is said, no discrimination in favor of large buyers.

Steel.—The market continues active. Mills here have about all they can do. Some of our manufacturers report that they have more to do now than ever before, and that, although working up to their full capacity, they are unable to keep up with their orders. The consumption of Steel Boiler Plate has increased largely within the past year or two. Nearly all Western steamers are now using Steel instead of Iron boilers, being much more durable, with but little difference in cost. Tool Steel is still quoted at 11¢ @ 13¢; Machinery do., 5¢ @ 7¢; Spring do., 6¢ @ 7¢; Plow do., 5¢ @ 8¢; Tire do., 4¢ @ 5¢; Boiler Plate, 7¢ @ 8¢.

Nails.—The trade continues to improve as the season becomes more advanced, and the indications continue favorable for a good spring and summer business. The shipments, particularly by river, not only from here, but Steubenville, Wheeling and Ironton have been quite heavy during the past week or two, manufacturers, as well as jobbers, being anxious to take advantage of the very cheap river freights. Nails were shipped from Wheeling to St. Louis last week at 9¢ per keg, while the rate from here was from 9¢ to 10¢ per keg, a very low rate for the distance, 1200 miles. No change in prices: \$2.50, 60 days, for less than 200 kegs, and \$2.40, 60 days, for 200 kegs and upward. A special meeting of the Western Association will take place here to-morrow, to take action in regard to production, as the arrangement entered into last December expires the 1st of April. The action of the meeting, whatever it may be, will be sent to The Iron Age by wire.

Horse and Mule Shoes.—There is rather more doing, but no change in prices; 100 keg lots, \$3.80 @ \$4.80, cash.

Wrought Iron Pipe.—No improvement in the demand, but it is probable there will be within a week or two, or as soon as the weather becomes suitable for out-door work. Owing to the continued depression in the oil business, the inquiry for oil-well casing and tubing continues light. Discounts still quoted at 55 @ 60%.

Scrap.—We can report a small sale of old Iron Rails at \$20.50, cash, delivered here, with negotiations pending for more at same figure. Old Car Wheels, \$19 @ \$20; No. 1 Railroad Wrought Scrap, \$21 @ \$22; Boiler Scrap, \$24 @ \$25; Blacksmith do., \$20 @ \$21; Wrought Turnings, \$16 @ \$17; Cast Turnings, \$11 @ \$12; Car Springs, \$3 @ \$3.90; Car Axles, \$28 @ \$29.

Window Glass.—There is more doing, the shipments, especially by river, having been quite large within the last week or two, but prices continue weak, and to manufacturers are unsatisfactory, having been forced down to meet with competition from other points. Discounts may be quoted by the car load at 70 and 10 and 10, and, in extreme cases, 5 on top of these again. It appears to be the determination of the trade to give those who are responsible for the very low rates the benefit of the same, as they have been like the dog in the manger, doing no good for themselves and preventing others from doing any. In a jobbing way, quotations may be made at 70 to 70 and 5.

Coke.—The market for this important staple continues in a very dull and unsatisfactory condition, with but little prospect of any immediate improvement. Owing to so many Pig-Iron furnaces being out of blast, the consumption is meager, and with an over-supply and active competition, prices have been reduced to such an extent as to barely cover actual cost, if that. May be quoted at \$2.15 @ \$2.25 per ton, delivered free on cars in Pittsburgh.

Coal.—The coal trade continues dull, and next month there will be a suspension of mining in the Monongahela valley, the object being to prevent an accumulation of stock, as the down river markets are all overstocked, and owing to the open weather the consumption has been light all winter.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., Chattanooga, March 26, 1878.

General business has been very dull during the week. Peace prospects in the East depress the grain market, and induce farmers and other holders to be slow to sell. The opening of fine spring weather keeps farmers busy in the country, which curtails all kinds of commerce. The movement of Iron of all grades has probably fallen off slightly; especially is this true of manufactured Irons generally and of Bars and Nails particularly. There is, however, no slackening up of work, the mills not being up with their orders and expecting an improved trade once the spring

planting is done. The weather continues delightfully warm. Early fruits are formed, the valleys and hills are rapidly being covered with green foliage; much of the corn land in the Tennessee Valley and its tributaries has already been planted. A noticeable and important feature of the week's business in manufacturing circles is the reduction of coal to manufacturers 50¢ on the ton.

Pig Iron.—Trade has only been fair. Prices are fairly maintained. We quote: Coke Irons—No. 1 Foundry, \$20 @ \$21; do., \$18 @ \$19; No. 2, \$16 @ \$17; Gray Forge, \$13 @ \$14; White and Mottled, \$11 @ \$12. Hot Blast Charcoal—No. 1 Foundry, extra, \$20 @ \$21; do., \$19 @ \$20; No. 2 Foundry, \$17 @ \$18; Gray Forge, \$16 @ \$17; White and Mottled, \$15. Cold Blast Charcoal—Car Wheel Metal, \$22.50 @ \$27.50; do., Extra Standard, \$24.50 @ \$29.50; Forge, \$17.50 @ \$20.

Muck Bar.—Is quotable at \$27 @ \$31; Old Rails, \$17 @ \$18.50; Old Car Wheels, \$18.50.

Ores.—Brown Hematite, 50 to 56%; 1/2 ton, \$1.75 @ \$2.25. Red Fossiliferous, 50 to 56%; 1/2 ton, \$1.70 @ \$1.90. The above prices for Ores delivered in Chattanooga on cars or on the wharf from flat boats.

Nails.—The demand for Nails has slackened up somewhat, but is still sufficient to employ all the capacity of the mills, which are considerably behind their orders. We quote them at \$2.50, with usual discounts on large lots.

Manufactured Iron.—The demand for Merchant Bars is lighter, but the mills are all on full time, and will have to keep up that kind of work for some time to get near even with orders now in hand. Bar we quote at \$2. The demand for Bolts and Spikes continues good. We quote: Railroad Spikes, \$2.50; Light Rail, \$2.25; Track Bolts, \$3; Trestle Bolts, \$4.

Iron Rails.—Little doing, which little won't last long. The last iron Railroad Bar will soon be rolled in this district. We quote them at \$34 @ \$36 per ton.

Coke.—The supply is plenty, and prices the same, \$2.50 per ton, on cars in Chattanooga.

Coal.—We note above an important event in the coal market. The significance of this fall is in the prospect that an advance can never be established. We quote run of mine at \$2 1/2 ton to manufacturers, on cars in Chattanooga.

CLEVELAND.

CLEVELAND, March 26, 1878.

Iron Ore.—There have been no sales of Lake Superior Ores of any quantity during the past week. A considerable number of the furnaces, however, have been making inquiries for ores suitable for the manufacture of Bessemer Pig metal. This carries the conviction that the furnaces are more inclined toward making Bessemer than any other kind of Pig Iron, as that is the only kind promising ready sale. No ore has been started from the upper lakes, although shipping will be on the move pretty generally after the 1st of April, unless the stormy season prevailing at this writing over the lake region should continue unabated. The outlook for all kinds of ore is very discouraging.

Pig Iron.—Sales of Pig metal have not been made with great frequency or in large quantities during the past few days. There is a steady demand, however, but prices are not firm. Sellers are still in excess of the buyers, and the surplus stock is large.

Bar Iron and Nails.—There is a very active demand for all kinds of manufactured Iron and Steel. The manufacturers are all complaining, however, of sharp competition and low prices. Greater attention than heretofore is being given to the quality of the bars turned out. The general use of promiscuous scrap has caused, in many instances, the loss of reputation. Manufacturers are, therefore, taking more pains to make good Iron, and buyers are requiring it better, and are generally not so persistent for low prices.

Scrap Iron.—There is a general activity in Old Rails, although few actual transactions are reported. The low prices which buyers have been looking for have not come to pass, and holders are firm in spite of large stocks in hand. Old Wheels are in better demand and firmer in price. Steel Scrap of all kinds is in excess of the demand.

BOSTON.

MARCH 23.—Pig continues depressed, with only a limited hand-to-mouth demand. Prices on the whole tend downward, partly on account of the lower freights incident to the reopening of navigation. We quote: \$20.50 @ \$21 for No. 1; \$19 @ \$19.50 for No. 2, and \$18.50 @ \$19.25 for Gray Forge. Scotch Pig is dull, with a very light demand. Bar continues unchanged, quoting \$43 @ \$45 for Refined and \$35 @ \$36 for Common. American Rails, \$32 @ \$37. Steel Rails, \$43 @ \$44, from mill. Nails are in light demand at unchanged prices. Sheet is selling at 3¢ @ 3 1/4¢ per lb. Russia is quiet at 10 1/2¢ @ 11¢.

We quote English Spring Steel at 7¢ @ 8¢, gold; 9¢ @ 11¢ for German; 9¢ @ 11¢ for Machinery; 14¢ @ 15¢ for Cast; 10¢ @ 12¢ for Blister; 8¢ for American Spring; 13 1/4¢ @ 14¢ for Cast; 9¢ for Blister; and 8¢ for Machinery. Copper is a trifle easier, quoting 17¢ @ 17 1/2¢, with sales of some 200,000 lb at the price. There is nothing doing in futures. For manufacturers we quote: New Sheathing, 28¢; Bolts and Braziers, 30¢; Yellow Metal Bolts, 25¢ @ 25 1/2¢; ditto Sheathing, 20¢. Lead fails to respond much in price to the combination talk. Buyers purchase only to supply their immediate wants. We quote: Pig, 3 3/4¢ @ 4¢, currency; Sheet, 6 1/2¢; Pipe, 6¢; Tin-Lined Pipe, 15¢; Bar Lead, 5 1/2¢; all of these, excepting Pig, are subject to the usual trade or 10% discount. Antimony is strong at 12 1/2¢ @ 13¢, gold, for Boston spot lots, and Spelter is easy, closing at \$5.50 on the spot for 10-ton lots. Tin is a little firmer, with some speculative feeling. We quote: Straits, 15¢ @ 15 1/4¢; Banca, 17 1/2¢ @ 17 3/4¢; Refined English, 15¢ @ 15 1/4¢, gold. We quote Plates: Charcoal, I. C., \$6.25 @

\$6.50; Coke, \$5.50 @ \$5.75; and Terne, \$5.90 @ \$6.20, gold.—Commercial Bulletin.

ST. LOUIS.

Specially reported by Messrs. SPOONER & COLLINS, Iron Commission Merchants, 217 North Third street, St. Louis, under date of March 21: Our market is still quiet, consumers buying very little beyond actual wants. The outlook is not very cheering, still we anticipate St. Louis will do her share of the Iron trade for the year 1878.

	No. 1.	No. 2.	Mill.	White and M't'd
M'souri Stone Coal.....
Missouri Charcoal.....
Tenn. Charcoal.....
South. Coke, soft and strong.....
Hang. Rock Charcoal.....
Hang. Rock Charcoal, Cold-short.....
Extra No. 1 L. M. Ore.....
Extra No. 1 Ore.....
Extra No. 1 Ore.....
West Va. Coke.....

	No. 1.	No. 2.	No. 1.	No. 2.
Hang. Rock.....
Tennessee.....
Missouri.....
Georgia.....
Alabama.....
Assorted Bar Iron.....
No. 1 Railroad.....
Heavy Cast Scrap.....
Light.....
Old Rails.....
Old Car Wheels.....

CHICAGO.

L. R. HULL & Co., 95 Washington street, under date of March 25, report as follows: We have no improvement to report. Demand has not materially increased, but prices remain firm. Quotations unchanged:

	No. 1.	No. 2.	No. 1.	No. 2.
Lake Superior No. 1.....
" No. 2.....
" No. 3.....
" No. 4 and 5.....
AMERICAN SCOTCH.....
Mahoning Valley, No. 1.....
Shawnee, No. 1.....
" No. 2.....
Jackson County, Ohio, No. 1.....
" No. 2.....
Silvery Gray.....

BALTIMORE.

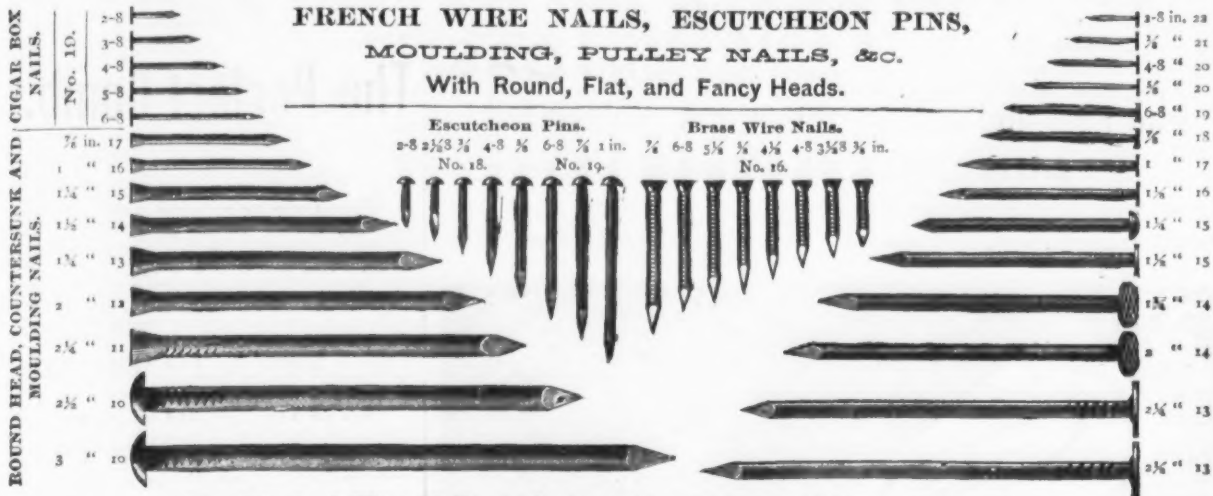
Mr. W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, report as follows: Trade has ruled inactive and quiet for the past week, without any new feature to note. Values, however, are firm and unaltered at annexed figures:

(From The Mining Journal.)						
	£.	s.	d.	£.	s.	d.
Iron.						
Pig, ord., f.o.b. Clyde.....	2	11	0			
" " Scotch, all No. L.....	2	12	6		3	10
Bars, Welsh, f.o.b. Wales	5	15	0			
" " Stafford, in London.....	7	0	8		0	0
" " In type or tees.....	5	10	0		5	15
" " Rolling, London.....	9	15	0			
Rails, Welsh, at works.....	5	0	6		2	6
Sheets, Staff., in London.....	8	15	0		0	0
Fires, ship, in London.....	7	0	7		5	0
Hoops, Staff., in London.....	7	15	0		0	0
Nail Rods, Staff., in London	6	10	0		7	0
Metal.						
English, spring.....	14	0	0		19	0
" " cast.....	30	0	0		40	0
Swedish, bar.....	17	0	—			
" " forg, ham.....	17	0	—			
Lead.						
English, Pig, common.....	18	5	0		18	7
" " " I. R.....	18	7	0		—	—
" " Sheet and Bars.....	18	15	0			
" " Pipes.....	20	0	—			
" " Red.....	21	0	0		22	0
" " White.....	27	6	0		28	0
" " Patent Shot.....	25	10	0			
Spanish.....	17	5	0		18	0
Copper.						
Metal, per cwt.....	0	0	30		0	0
Ore, in percent, per ton, 14	0	0	36		0	0
Quicksilver.						
Flasks of 75 lbs, ware.....	7	2	6		—	—
Tin.						
Silesian or Rhenshal.....	28	15	0		18	17
English, Swansea.....	21	0	0		—	—
Sheet Zinc.....	22	0	0		23	19
Zinc.						
English, Ingot, f. o. b.....	67	0	0		—	—
" " Refined.....	70	0	0		—	—
Australian.....	65	15	0		—	—
Barras.....	65	15	0		—	—
Straits.....	65	15	0		—	—
Upper.						
Tough Cast and Ingot.....	60	0	0		69	0
Best Selected.....	60	0	73		0	0
Sheets and Shaming.....	74	10	75		0	0
Flat Bars.....	74	10	75		0	0
Wallaroos.....	75	0	0			nom.
Churns, or P.C.C. C.....	75	0	0			nom.
Their bars.....	75	0	0			
Bill bars, g. o. b.....	70	0	0			
Phosphor.						
Bearing Metal.....	112	0	0			
Other Alloys.....	120	0	0		140	0
Brass.						
Wire.....	0	0	85		—	—
Tubes.....	0	0	90		—	—
Sheets.....	0	0	90		—	—
Yel. Met. Sheeth & Sheets	0	0	90		0	6 1/2
Nail composition.....	0	0	85		0	9
Charcoal.						
.....nat qual. 1	0	0	1		1	1
.....at qual. 0	19	6	1		0	0
.....at qual. 0	17	6	1		0	0
Black.....P. ton. 15	0	0	15		0	0
" " at Liverpool.....	11	0	15		0	0
Black Tanners, ass of ratio 10	0	0	15		0	0
At the Works, etc., of the above firms, prices are for ordinary iron, per ton less for Canada; IX G, per box more than IX quoted above, and add 5s. for each X. Some plates brands.						

HOBART'S TACKS

MANUFACTURED BY
DUNBAR, HOBART & WHIDDEN,
ESTABLISHED 1810.

Office and Salesroom, 116 Chambers Street, New York. . . . Factory, South Abington, Mass.



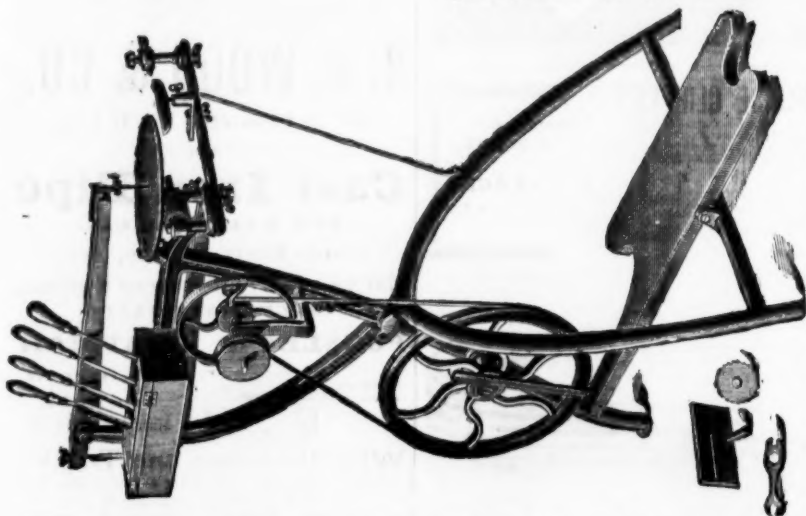
Any Kind of Wire Nails made to order from Description, or Samples.

American and Swedes Iron Tacks,

Tinned, Leathered and Large Head Carpet Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners' Copper, Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points, Iron, Steel, Copper and Zinc Shoe Nails, Patent Improved Brass Shoe Nails, Heel and Toe Plates, Steel Shanks, and Fancy Head Nails, Silver or Japanned Lining and Saddle Nails, A full assortment always on hand at salesrooms, for immediate delivery if required. Odd and Irregular Sizes made to order or cut from sample at short notice. Send for Price List.

LESTER SAW.

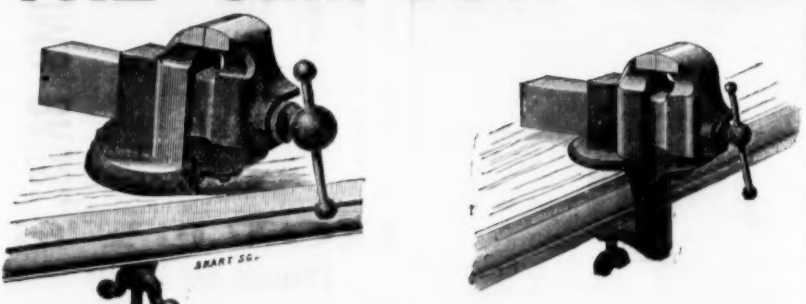
The New Lester Saw is made of Iron, with all the working parts of Steel, and contains all known improvements to this Date.



It is handsomely painted red and green, with red stripes, and presents a beautiful appearance. Those parts which are not painted are either polished or japanned. We warrant the Saw to be just as herein stated, and we know it will give entire satisfaction, being a more expensive machine than those which we formerly sold for \$25. It consists of—
1st.—A SCROLL SAW, with Tilting Table for Inland work; arms 18 inches in the clear; clamps which will hold saws of any length or width, and face them in four different directions; cutting lumber from 1/8 inch to 1 inch in thickness; speed, 100 strokes per minute.
2d.—A CIRCULAR SAW, 24 inches in diameter, which will cut lumber one-half inch and less; with an iron table, 4 by 5 inches.
3d.—A DRILLING ATTACHMENT, with six Stubbs' Steel Drills, of various sizes, for wood or iron work.
4th.—An EMERY WHEEL, with wide and narrow rim.
5th.—A TURNING LATHE, with iron ways and rest, steel centres, and three best steel turning tools; length of ways, 15 inches; distance between centres, 6 inches; swing, 3 inches; length of slide rest, 4 1/2 inches; number of revolutions per minute, 200.
Also, with each machine, six Saw Blades, a Wrench, Screw-driver, extra belt, and two sheets of Designs, with a nice box for the small tools, and a box for the whole machine. It is taken apart when shipped, and packed in a box, but the working parts are all left in place, and the frame is put together again by a single bolt.
PRICE FOR EVERYTHING ABOVE NAMED, \$8.00.
The same, without the Lathe and Circular Saw, \$6.00.
When desired, we furnish with the Lathe a very nice Drill Chuck, for working metal, and a Tail Stock, with a screw centre, for \$2 extra. The machine alone weighs 47 lbs., and, with the box, 70 lbs.
We also keep a full stock of Tools and Supplies in the Bracket Sawing line.

MILLERS FALLS MFG. CO., 74 Chambers St., N. Y.

THE SIMPSON VISE.



WITH RAPID ADJUSTMENT AND HARDENED STEEL-FACED JAWS.
Simple, Strong, Durable.

DEFIANCE PLANES.



A finely tempered cutter of Firth's first quality English Steel in every one, whether the list price is 75¢ or \$7.00. Sample orders solicited. Send for catalogue to
BAILEY WRINGING MACHINE CO., Sole Agents,
No. 99 Chambers Street, New York.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Axes and Hatchets,
Grub Hoe and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Hing Bush Hooks,
Axe Eye Bush Hooks,
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Carpenters' Drawing Knives,
Coopers' and Turpentine Tools.

MARTIN DOSCHER Agent, 96 Chambers Street N. Y.

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FINISHED
(BRIGHT OR BLUED)



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NATIONAL HORSE NAIL CO.,
VERGENNES, VT.

HORACE DURRIE & CO., Agents,
No. 97 Chambers St., New York

A X E S
BEST BRANDS SOLD.
X BULLION, A
\$9.50 per doz.
E LIPPINCOTT'S, X
\$9 per doz.
S DIAMOND, E
\$8 per doz. Cash, 30 days.
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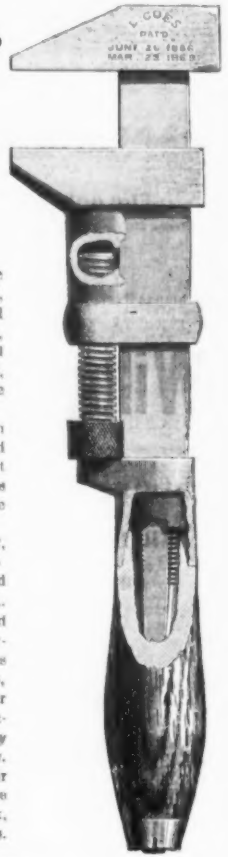
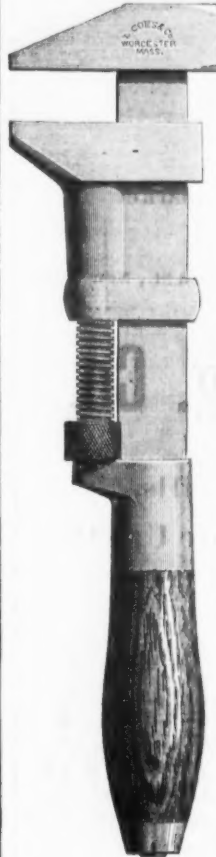
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Genuine Improved Patent

Manufactured by

L. COES & CO.,
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Established in 1839.

We invite the particular attention of the trade to our New Straight Bar Wrench, widened, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes, which were at once closely imitated and sold as the Genuine Wrench by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped.

"L. COES & CO."

Warehouse, 97 Chambers St., & 81 Reade St., N. Y.
HORACE DURRIE & CO., Sole Agents.



Keystone Wringers

Has all the LATEST Improvements:
Best Patent all White Rubber Rolls,
Two long Spiral Steel Springs,
Patent Swiveled Adjustable Clamps,
Metal Journal Boxes,
Best Crank Fastening,
Strongest and Best Finished Frame,
All Iron Parts are thoroughly galvanized.
The most Convenient, Durable and Easy
Turning Wringer made.
It has Greater Capacity than any other
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White Rubber Rolls, Metal Journal Boxes, Patent Crank Fastening, Rubber Fastening Pads, Maple Wood Frames, Simple, Durable, Efficient.

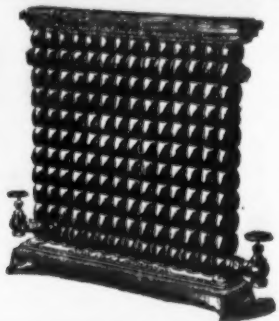


Wrought Iron Thumbscrews, Apron or Clothes Guard, Hickory Spring Bar and Rubber Springs. Perfect in Finish. Send for Circulars.

THE AETNA SPRING AND AXLE CO.,

John St., Bridgeport Conn., Manufacturers of THE VERY BEST SPRINGS AND AXLES.
Our Standard Springs, weighing about half as much as the Springs of other makers, to do the same work cost but little more per vehicle than a common Spring. Our Jamb-screw, Colling Collar, Parallel Arm, Malleable Iron Box Axles are the best in the world. Exclusive makers of LEWIS'S TORSION AND CROSS SPRINGS.
Supercedes the Browder Cross and End, dispenses with side spars, weigh less, hangbody equally low, ride easier and cost less. Shop newly stocked with new and improved Machinery. Send for Price Lists.
W. H. WILSON Pres. and Treas. O. F. LEWIS formerly of Spring Perch Co., Sec. and Supt.

SNOW'S PATENT CAST IRON RADIATOR.



The only Perfect Circulating Radiator in the market
Address the manufacturers.

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GREENFIELD, MASS.

Lightning Screw Plates, Green River Drills,
Lightning Bolt Cutters, Green River Tire Upsetters,
And other Labor Saving Tools for Machinists, Blacksmiths,
and Carriage Makers.



SCREWS CUT IN ONCE GOING OVER THE BOLT.

EMPIRE GUM

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CORE PACKING.

10 Years.



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Only self-lubricating Gum Core Packing which received medal and certificate of award. From Judges Report on Awards, International Exhibition, Philadelphia, 1876: "That the Piston Rod Packing in composition and combination is well fitted to furnish the tightness and elasticity required." Its claims to superiority are firmly established, and it is fast superseding all other kinds of Packing. It is alike adapted to Stationary, Locomotive and Marine Engines; also Pumps, both Hot and Cold Water, or for any other purpose for which Packing may be required. Write for circular and discounts.

CANFIELD MFG. CO., Patentees and Sole Manufacturers, 127 N. 7th St., Philadelphia, Pa.

THE HP HORSE NAIL CO.,

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These Nails

These Nails

are manufactured from the
Best Selected Stock.

Guaranteed to be Equal

Send for circulars showing dis-
counts.

to the best in the market, and are
sold at greatly reduced rates.

5d 6d 7d 8d 9d 10d
26c. 23c. 21c. 20c. 19c. 18c.

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ESTABLISHED IN 1862,

Hammered & Finished Horse Nails.

We offer our Finished Nail to the trade with the confidence that it has no equal in the market. It is the genuine "Northwestern" Nail, Finished, and we give it our unqualified guaranty.

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A. W. KINGSLAND, Secretary.

Our agents, Graham & Haines, 113 Chambers Street, New York, carry a full line of our goods, and will be pleased to serve you at Factory prices.

GLOBE NAIL COMPANY,

MANUFACTURERS OF

Pointed Polished & Finished Horse Shoe Nails.

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

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RHODE ISLAND HORSE SHOE CO.,

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Manufacturers of

PERKINS and RHODE ISLAND PATTERNS of

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BRASS COCKS AND VALVES

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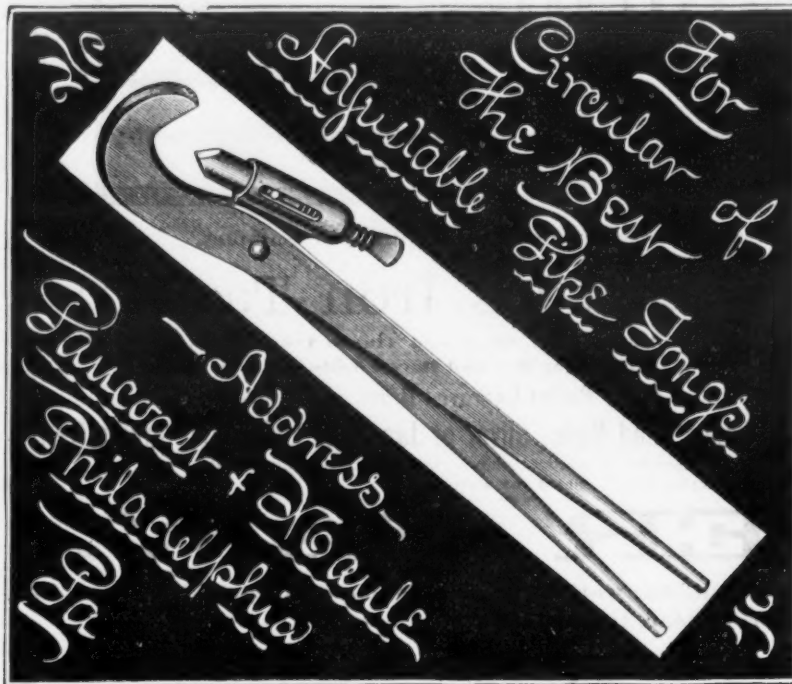
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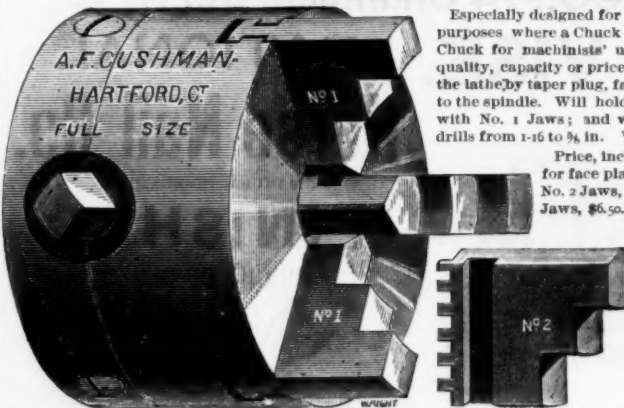
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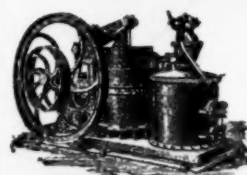
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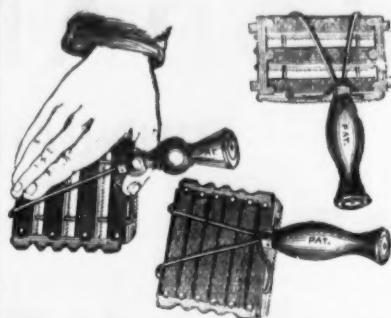
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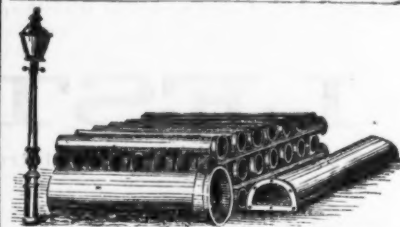
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 These goods are sold by all leading jobbers in General and Saddlery Hardware at manufacturers' prices. Sample snap sent free of charge if desired.
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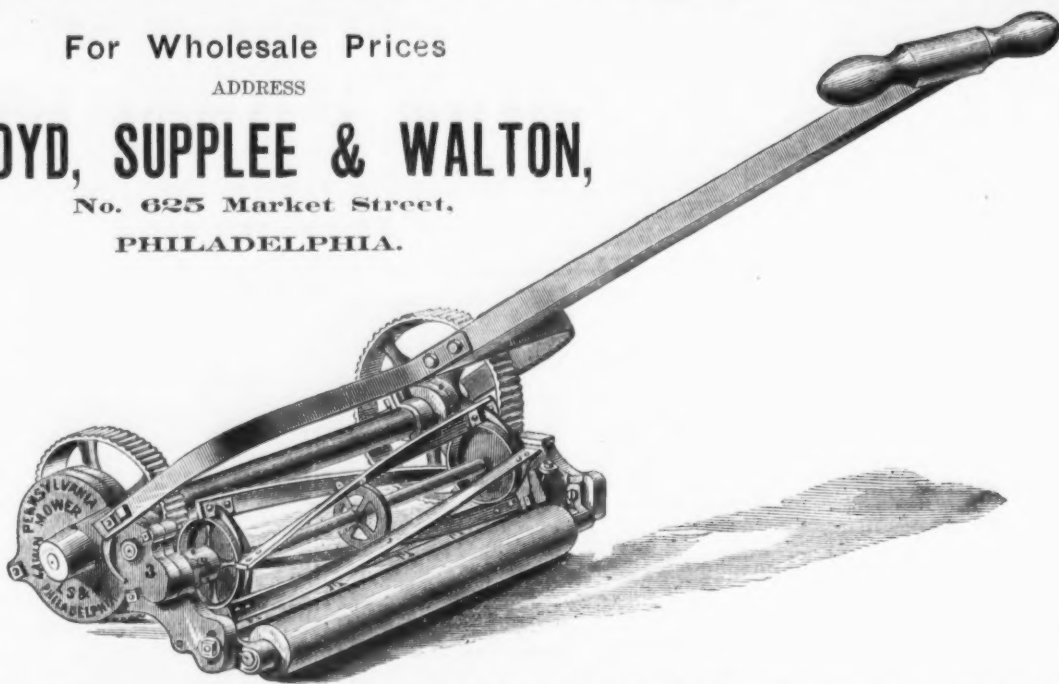


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For Wholesale Prices
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LLOYD, SUPPLEE & WALTON,
 No. 625 Market Street,
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This machine presents all the advantages of a light and durable LAWN MOWER, and we believe has good qualities which cannot fail to be appreciated. It is the lightest machine in use, and all that is necessary to satisfy our customers of its superiority is to place it in competition with any other machine in the town in which they may reside. Every machine warranted to work as represented.

PRICE LIST.

WIDTH OF CUTTER.	DESCRIPTION.	PRICE.
12 inch.	8 inch driving wheels, weight 33½ lbs. Can be used by a lad.	Each, \$18.00
14 "	8 " " " " 34½ " " lady.	" 20.00
16 "	8 " " " " 36½ " One man size.	" 22.00

The above are retail prices. Wholesale prices given upon application to

LLOYD, SUPPLEE & WALTON.

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Bonney's Patent Hollow Augers, Spoke Shaves and Trimmers,
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Budke's Patent Sheet Iron MEASURES.
 Black and galvanized
 House, Steamboat, Stable and Well
 BUCKETS.
 Powder Kegs, Paint, Putty and White Lead PAILS.

Also Cold Rolled Sheet Iron, Bar, Sheet and Tank Iron and Nails.

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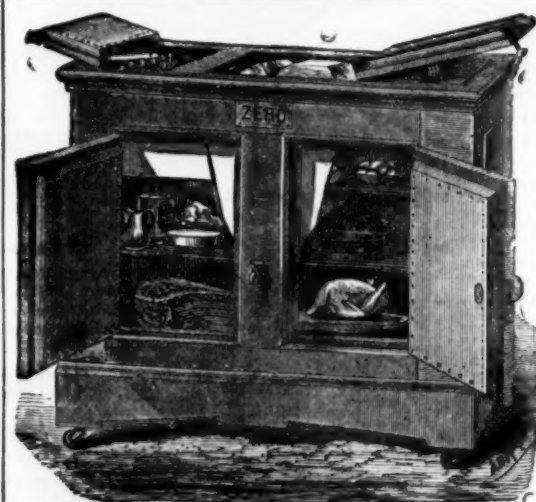
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 The Zero Refrigerator was awarded the Highest Premium by the Centennial Exhibition.

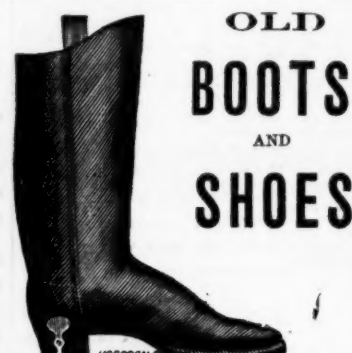
Report.—1st. Beauty of design and excellent workmanship. 2d. Absence of all communication between the ice and provision chambers. 3d. Absence of moisture on the inside lining. 4th. Impossibility of contact of hot air with the ice. 5th. The condensation of moisture on the cold surface of the ice box. 6th. Economy of ice and uniformity of temperature. 7th. The filling with cork.
 Also the POLARIS, NEWPORT and SARATOGA COOLERS, for the sick room, persons boarding, offices, etc. The "Zero" Market, Picnic and Fishing Baskets, for carrying Meats, Fruits, Fish, etc.

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VALVES BORED OUT IN THEIR PRESENT
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Repairs for Stoves made at Troy, Albany, Rochester,
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No. 1, 10x4 in. face, 4 in. jaw Vise, weight 40 lbs., \$4.50
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 No. 3, 6x2½ in. " 2½ in. " 14 " 3.00
 The face of the Anvil is chill hardened. Terms cash.
 Delivered on cars at Worcester.

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WROUGHT IRON STOVE LINING.

This is the most valuable improvement
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It will last as long as the Stove, and will not
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We are now prepared to manufacture all kinds of regular and special

FILES AND RASPS.

We keep in stock all the different lengths and cuts of the regular Files and Rasps for Machinists and Wood Workers. All Files and Rasps made by us are warranted equal to the best that can be made, imported or domestic. Mill Saw Files and Taper Saw Files are warranted superior to any others in the market.

The unequaled facilities we possess for testing the quality of all kinds of Saw Files enable us to make a most superior article.

DISSTON CHOICE TAPER.



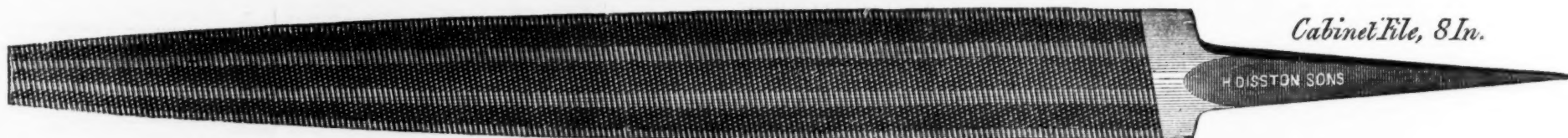
Flat File, Smooth, 8In.



Mill Saw File.



Cabinet File, 8In.



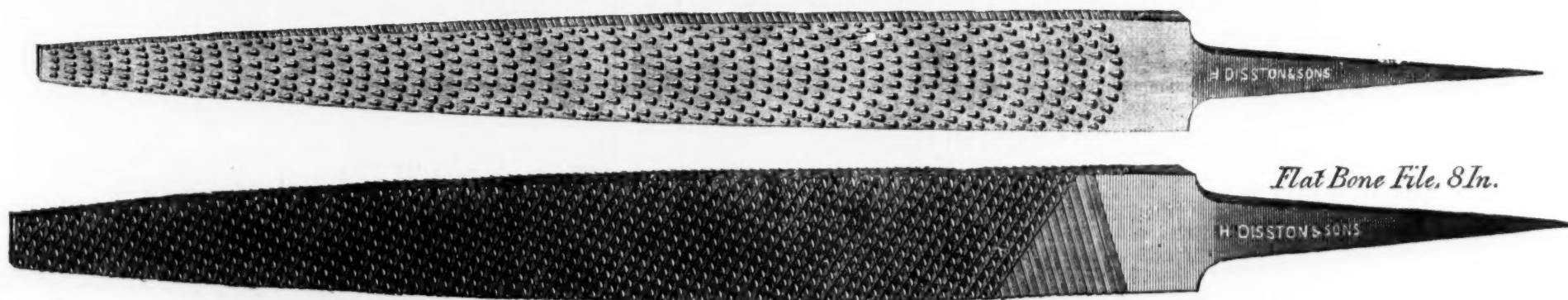
Flat File, 2nd Cut, 8In.



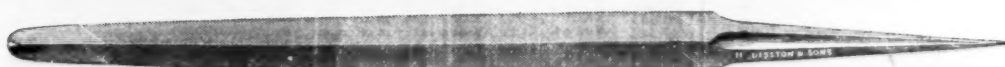
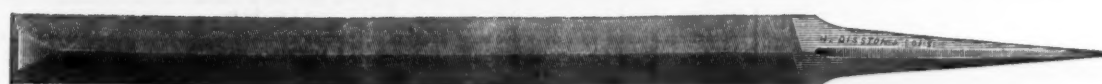
Taper Colter, Bastard, 8In.



Flat Bone File, 8In.



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New York Wholesale Prices, March 27, 1878.

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Sundries.

Asphaltum.....
Benzine.....
Chalk.....
Block.....
Dryer, Patent, Am'n.....
Frostings.....
Gum, White.....
Glaziers' Points, Zinc.....
Gum, Copal.....
Spartan.....
"Sheelag, English.....
"dark.....
Litharge, English.....
Pumice Stone, selected Lamps.....
Putty, in powder.....
"in bulk.....
Rotten Stone, soft, English.....
Spirits Turpentine.....
Whiting Spanish.....

Glass.

FRENCH WINDOW GLASS.
Prices current per box of 50 feet.
Single Thick.—discount 60 %

SIZES.	1st.	2d.	3d.	4
6 X 8 to 10 X 15.....	\$ 7.50	\$ 6.75	\$ 6.25	
11 X 14 to 16 X 24.....	8.50	7.75	7.25	
13 X 22 to 20 X 36.....	10.75	9.75	8.75	
15 X 30 to 24 X 36.....	12.25	10.75	9.00	
20 X 28 to 24 X 36.....	13.00	11.50	9.75	
20 X 37 to 26 X 44.....	14.50	13.48	10.74	
20 X 40 to 30 X 50.....	15.00	14.00	11.25	
30 X 52 to 30 X 54.....	16.00	14.50	12.00	
30 X 50 to 34 X 70.....	17.25	15.50	13.50	
34 X 54 to 34 X 56.....	18.25	17.25	15.00	
30 X 60 to 40 X 60.....	20.75	18.75	17.25	

Double Thick.—Discount 60 to 75 %

SIZES.	1st.	2d.	3d.	4
6 X 8 to 10 X 15.....	\$12.00	\$11.00	\$10.00	
11 X 14 to 16 X 24.....	13.75	12.50	11.75	
13 X 22 to 20 X 36.....	17.25	15.75	14.00	
15 X 30 to 24 X 36.....	19.75	18.25	16.50	
20 X 28 to 24 X 36.....	21.00	19.50	17.75	
20 X 37 to 26 X 44.....	23.25	21.25	19.25	
20 X 40 to 30 X 50.....	24.00	22.50	20.00	
30 X 52 to 30 X 54.....	25.75	23.25	20.25	
30 X 50 to 34 X 70.....	27.75	25.00	21.75	
34 X 54 to 34 X 56.....	29.25	27.25	24.50	
30 X 60 to 40 X 60.....	32.25	30.00	27.75	

Sizes above 40 x 60—\$10.00 per box extra for every five inches.

An additional 10 per cent. will be charged for Glass more than 40 inches wide. All sizes above 10 inches in length, and not making more than 80 inches, will be charged in the 1/2 united inches for width.

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Portable and the handiest Earth Auger in Market. Bore three holes while any other Auger is boring one. Works in clay, sand, gravel or muck soil, and without the use of shovel or spade to start it.

To the trade, \$3.00 each. Less 20 per cent.



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The best, the cheapest, the most durable and the handiest Earth Auger in Market. Made from the best cast steel ; will bore three holes while any other Auger is boring one, and is run with less power ; works readily in clay, sand, gravel or muck soil, and will cut sharply through grass or root sods without the use of shovel or spade to start it.

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Globe Horse Nails, Putnam Horse Nails, National Horse Nails, Buffalo Forged Horse Nails, Burden Horse Shoes, Walker Horse Shoes, Providence Horse Shoes, Toe Calks, Cast Steel, Bellows, Anvils and Vises.

FRANCIS' AXES, full Assortment. Special Brands—"KING OF THE FOREST," "ROYAL WOOD CHOPPER."

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New York Wholesale Prices, March 27, 1878.

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A. W. H. American. 1/2 in. 1000.....		Am. Spiral Spring Butt Co., Japanned.....		Fancy.....		Providence Plate 1/2 in. 1000.....		Pinning Machine.....	
Armstrong's Mouse House. 1/2 in. 1000.....		Sabin Mfg. Co., Double Acting.....		Union Spring Hinge Co.....		Screw Hook and Strap.....		Astor Plating Machine.....	
B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Heavy Welded Hook.....		Crown Plating Machine.....	
B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
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B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
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B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
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B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
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B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
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B. W. B. American. 1/2 in. 1000.....		Blind Butts, Parker.....		Blind Butts, Parker.....		Screw Hook and Eye.....		Planes and Plane Irons.....	
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Screw Drivers.	
Hart, Bliven & Mead, new list.....	dis 40 to 5
Douglas Mfg. Co.....	dis 30 to 5
Diakon's.....	dis 45 to 5
Buck Bros.....	dis 25 to 5
Stanley Rule & Level Co.....	dis 40 to 5
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Round Head Iron.....	dis 40 to 5
Flat Head Brass list Sept. 1, '75.....	dis 40 to 5
Round Head Brass list Sept. 1, '75.....	dis 40 to 5
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Japanese list.....	dis 40 to 5
Laid or Common Coach.....	dis 40 to 5
Coach, Patent Gilt Point.....	dis 40 to 5
Best.....	dis 40 to 5
Round Head, Iron.....	dis 40 to 5
Machine, Flat Head, Iron, Am. Screw Co.....	dis 40 to 5
Best.....	dis 40 to 5
Round Head, Iron.....	dis 40 to 5
Hand.....	dis 40 to 5
Hand Rail, Sargent & Co's.....	dis 40 to 5
Hudson, Beckley & Co's.....	dis 40 to 5
Jack, Bell Bottom.....	dis 40 to 5
Sash (T. & S. Mfg. Co.).....	dis 40 to 5
Scythes.	
Blood's German Steel, Grass.....	dis 40 to 5
"Cast.....	dis 40 to 5
"Silver.....	dis 40 to 5
"German.....	dis 40 to 5
"Cast.....	dis 40 to 5
Excelsior and Granger.....	dis 40 to 5
Young America.....	dis 40 to 5
Silver Clipper.....	dis 40 to 5
Wadsworth's Grass.....	dis 40 to 5
Scythe Snaths.....	dis 40 to 5
Shears and Scissors.	
American.....	dis 40 to 5
Cast Steel.....	dis 40 to 5
Iron.....	dis 40 to 5
Seymour's Straight.....	dis 40 to 5
Scissors.....	dis 40 to 5
Pruning.....	dis 40 to 5
Barnard's Lamb.....	dis 40 to 5
Timbers.....	dis 40 to 5
Sheep Shears.	
Sheep Pat. Solid Bent.....	dis 40 to 5
Inches.....	dis 40 to 5
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Bliding Door, M. W. & Co. list.....	dis 40 to 5
"R. & E. list.....	dis 40 to 5
"Patent Roller.....	dis 40 to 5
"Hartfield's.....	dis 40 to 5
Bliding Shutter.....	dis 40 to 5
"Russell's Anti-Friction.....	dis 40 to 5
"Sargent's list.....	dis 40 to 5
Moore's Anti-Friction.....	dis 40 to 5
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American.....	dis 40 to 5
not stamped "Ame".....	dis 40 to 5
Rowland's.....	dis 40 to 5
Kimball Shovel Co.....	dis 40 to 5
Old Colony.....	dis 40 to 5
Middlebury's.....	dis 40 to 5
Hemington's (Lowman's Patent).....	dis 40 to 5
Dunning's Shovels and Spades.....	dis 40 to 5
B. Rowland & Co., Anchor Brand.....	dis 40 to 5
"Patent.....	dis 40 to 5
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Shovels and Spades.....	dis 40 to 5
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Slates.....	dis 40 to 5
Square Frames, Round Cornered, by case.....	dis 40 to 5
Less than a case.....	dis 40 to 5
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North Carolina Handle Co.....	dis 40 to 5
Spoke Trimmers.	
Defiance Metallic.....	dis 40 to 5
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Iron.....	dis 40 to 5
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Rail's.....	dis 40 to 5
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Bonney's.....	dis 40 to 5
Stearns.....	dis 40 to 5
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Douglas.....	dis 40 to 5
Spoons.	
Tinned Iron.....	dis 40 to 5
British.....	dis 40 to 5
Derby Silver Co.....	dis 40 to 5
L. Boardman & Co., A. T.....	dis 40 to 5
Hogers & Bro., A. T.....	dis 40 to 5
Reed & Barton.....	dis 40 to 5
Hogers Cutlery Co.....	dis 40 to 5
Hall & Elton.....	dis 40 to 5
Holmes, Booth & Haydens.....	dis 40 to 5
German Silver (Hall & Elton's).....	dis 40 to 5
German Silver (L. Boardman's).....	dis 40 to 5
Diamond Steel (L. Boardman's).....	dis 40 to 5
Tin (P. & W.).....	dis 40 to 5
Tin Cows Hdw. Co.....	dis 40 to 5
Stocks and Dies.	
Hindostan Stone.....	dis 40 to 5
Axstone.....	dis 40 to 5
Slips.....	dis 40 to 5
Sand Stone.....	dis 40 to 5
Washita Stone.....	dis 40 to 5
Slips.....	dis 40 to 5
Arkansas Stone.....	dis 40 to 5
Grindstones.....	dis 40 to 5
Slips, Loring's.....	dis 40 to 5
Stove Polish.	
Joseph Dixon's.....	dis 40 to 5
Gold Medal.....	dis 40 to 5
Rising Sun.....	dis 40 to 5
Squares.	
Steel.....	dis 40 to 5
Iron.....	dis 40 to 5
Silver Plated.....	dis 40 to 5
Star Try Squares and Bevels.....	dis 40 to 5
Diakon's Try Squares and Bevels.....	dis 40 to 5
Waterbottom's Try and Mitre.....	dis 40 to 5
Bailey's Try Squares and T. Bevels.....	dis 40 to 5
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"Full.....	dis 40 to 5
"Swedes.....	dis 40 to 5
"Tinned.....	dis 40 to 5
"Carpet, Am. and Swedes.....	dis 40 to 5
"Tinned.....	dis 40 to 5
"Copper.....	dis 40 to 5
Brads, Half Weight, American.....	dis 40 to 5
Shoe Nails.....	dis 40 to 5
4ths and longer, 3c; 5ths 90c; 6ths 90c; 7ths 90c; 8ths 90c; 9ths 90c; 10ths 90c; 11ths 90c; 12ths 90c; 13ths 90c; 14ths 90c; 15ths 90c; 16ths 90c; 17ths 90c; 18ths 90c; 19ths 90c; 20ths 90c; 21ths 90c; 22ths 90c; 23ths 90c; 24ths 90c; 25ths 90c; 26ths 90c; 27ths 90c; 28ths 90c; 29ths 90c; 30ths 90c; 31ths 90c; 32ths 90c; 33ths 90c; 34ths 90c; 35ths 90c; 36ths 90c; 37ths 90c; 38ths 90c; 39ths 90c; 40ths 90c; 41ths 90c; 42ths 90c; 43ths 90c; 44ths 90c; 45ths 90c; 46ths 90c; 47ths 90c; 48ths 90c; 49ths 90c; 50ths 90c; 51ths 90c; 52ths 90c; 53ths 90c; 54ths 90c; 55ths 90c; 56ths 90c; 57ths 90c; 58ths 90c; 59ths 90c; 60ths 90c; 61ths 90c; 62ths 90c; 63ths 90c; 64ths 90c; 65ths 90c; 66ths 90c; 67ths 90c; 68ths 90c; 69ths 90c; 70ths 90c; 71ths 90c; 72ths 90c; 73ths 90c; 74ths 90c; 75ths 90c; 76ths 90c; 77ths 90c; 78ths 90c; 79ths 90c; 80ths 90c; 81ths 90c; 82ths 90c; 83ths 90c; 84ths 90c; 85ths 90c; 86ths 90c; 87ths 90c; 88ths 90c; 89ths 90c; 90ths 90c; 91ths 90c; 92ths 90c; 93ths 90c; 94ths 90c; 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851ths 90c; 852ths 90c; 853ths 90c; 8	

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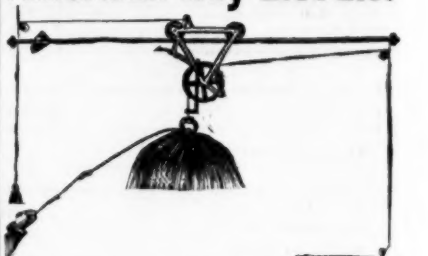
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"THE IRONMONGER" was established in 1859, and is the oldest and only representative organ of the Iron, Hardware and Metal Trades. This Journal stands pre-eminent amongst trade publications, and possesses all the advantages of the Commercial Newspaper and a high-class Literary Magazine. The principal characteristics of "THE IRONMONGER" are the accuracy of its Market Reports and Prices Current; the intrinsic value of its Home, Foreign and Colonial Correspondence; the impartiality of its criticism upon the leading novelties of the day; its careful selection of Agricultural, Legal and Magisterial News appertaining to the Metal Trades; the completeness of its list of Patents and general statistics, and its multiplicity of classified Advertisements. The main object of this publication is to furnish a faithful record of all things of specific value to those interested in the manufacture, purchase, consignment, shipment or sale of Hardware, Arms and Ammunition, Oils, Seeds, Implements, Machinery and Metals.

GREAT BRITAIN, IRELAND, Australasia, Belgium, Brazil, Canada, Cape of Good Hope, China, France, Germany, Greece, India, Italy, River Plate, Russia, Spain, the West Indies, and United States of America are the principal places where The Ironmonger is circulated, amongst

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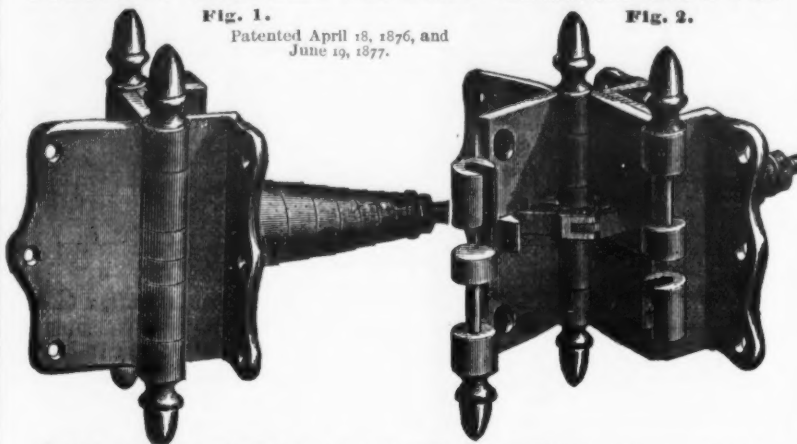
Montpelier, Vt.

PATENT DOUBLE ACTING SPRING BUTTS.

Fig. 1.

Patented April 18, 1876, and June 19, 1877.

Fig. 2.

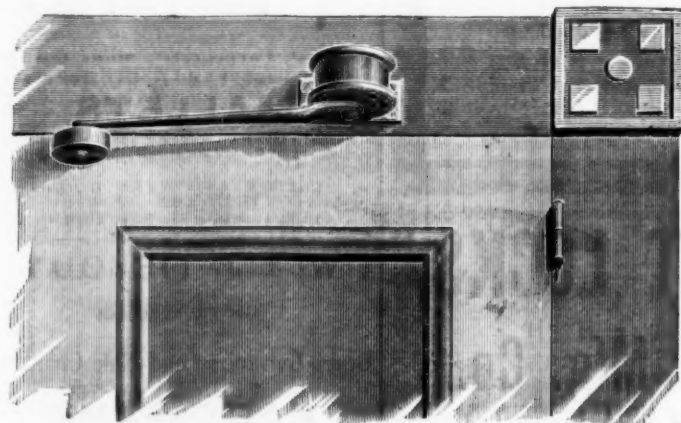


PRICE LIST OF DOUBLE ACTING SPRING HINGES.—(Japan Finish.)

Number.	Thickness Doors.	Price per pair.	Number.	Thickness Doors.	Price per pair.
3	3/4 to 1 1/4 inch.	\$2.50	5 1/2	2 1/2 to 2 3/4 inch.	\$6.25
3 1/2	1 1/4 to 1 3/4 "	3.00	6	2 3/4 to 2 7/8 "	7.50
4	1 3/4 to 1 7/8 "	3.50	6 1/2	2 7/8 to 2 3/4 "	9.00
4 1/2	1 7/8 to 2 "	4.25	7	2 3/4 to 3 "	10.50
5	2 to 2 1/4 "	5.25			

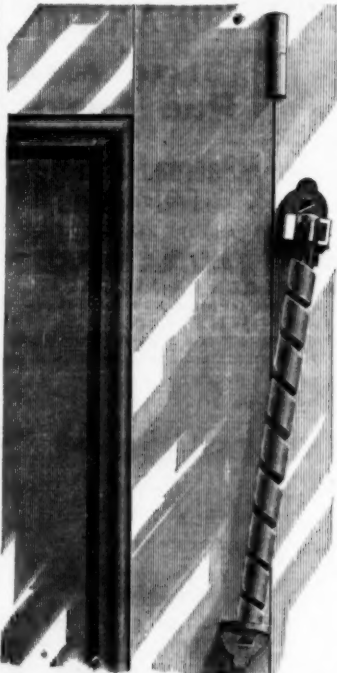
Discount to the trade 35%. Plated tips, 25¢ extra per pair. In ordering these Butts, state whether for outside or inside doors, and give size of doors.

SABIN'S LEVER DOOR SPRING.



PATENTED IN CANADA,
March 27, 1876, and Sept. 23, 1876

THE BOSS DOOR SPRING.



The above cuts show our PATENT DOUBLE ACTING SPRING BUTTS for swinging doors both ways. Figure 1 shows the Butt when shut, and figure 2 when opened. These Butts are the first ever constructed with two leaves only, and with flanges attached thereto for fastening to the door and casing, thus rendering them much more substantial and easy to put on, as the screws are all driven from the outside. And the Butts can be put on ready to operate without opening the leaves of the Butt, and by means of the flanges the door is hung firmly to the casing, instead of to a strip, as is the case with all other double acting Butts. A strong right angle flange, cast solid on the leaf of the Butt, embraces and clamps the door-stile firmly, and the screws do not become loose, as the strain on them is much less. The attachment of flanges to the leaves of a double acting Butt is a new and important improvement in double acting hinges, for which device a patent has been issued. At the back of the other leaf is attached a powerful volute spring, the draw-rod of which is linked to the first named leaf and throws the strain of the spring in a direct line with the center of the door. This spring holds the door up firmly to its place and obviates all tendency to sag.

Our Lever Spring.

The advantages of this spring for heavy outside doors subject to strong air currents:

1st. It is simply constructed and not liable to get out of order.

2d. It is self-contained—there being no attachment to the door—and no straps, strings, or chains to break and render the springs useless.

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5th. It closes a door perfectly if only opened a few inches—and is more desirable—as the wider the door is opened, the less pressure is had upon the door.

6th. It can be rendered inoperative at any time if desired without detaching any part of it.

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The advantages of this Spring over all other cheap Springs are its superior elasticity, being coiled from flat steel, and not as rigid in its action, or as liable to set in operation. Our patented method of adjustment is superior, as there are no pieces to lose, and no possibility of the Spring becoming detached in operation. The Spring can be readily removed when desired without taking out any screws, and quickly replaced when wanted.

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THEY HAVE**STERLING METAL KEYS**

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NEW PATENT

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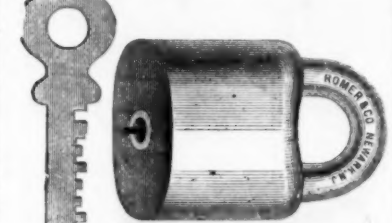
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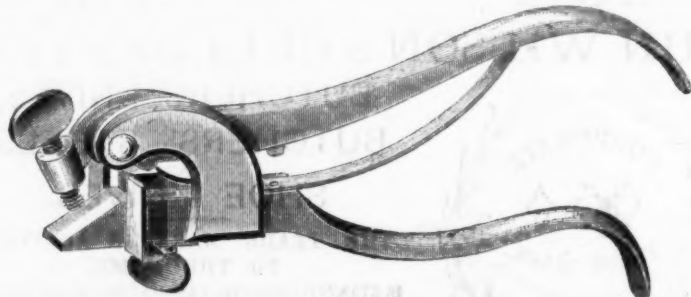
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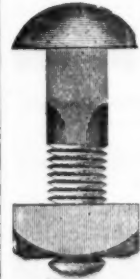
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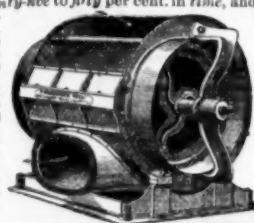
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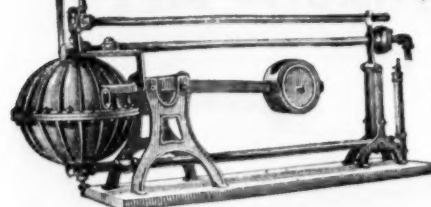
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This Cupola has made a great revolution in melting iron. It differs from all others in having a continuous furnace, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made oval in form. This brings the blast to the center of the furnace with the least resistance and smallest possible amount of power, and in combination with the continuous furnace causes complete diffusion of the air throughout the furnace, and uniform temperature, melting ten or fifteen tons an hour with the pressure of blast required to melt five or three tons in an ordinary Cupola. It also enables us to save very largely in time and fuel, the experience of our customers showing a gain of twenty-five to fifty per cent. in time, and twenty-five to forty per cent. fuel over the ordinary Cupola, and a better quality of casting, especially in light work. This is due to the thorough diffusion of the air, and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting.

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This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

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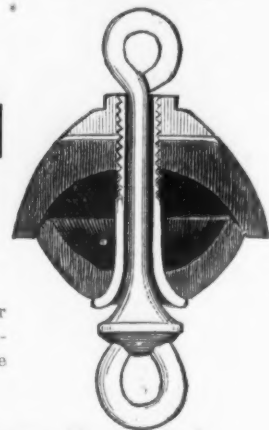
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For Chain Pumps.



These Patents cover the use of the Rubber, the use of the Nut and Bolt for expanding, the use of the Tube and Valve for draining. All others are infringing, and manufacturers and dealers in infringing Buckets will be prosecuted to the full extent of the law.

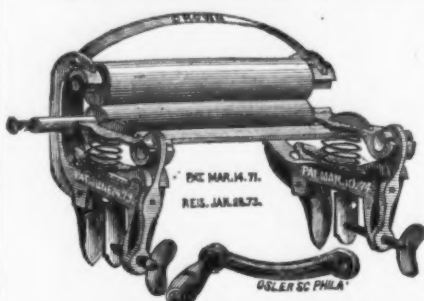
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CROWN WRINGERS,

with Patent White Rubber Rolls, Galvanized Malleable Iron Frame Work, Bessemer Steel Springs, &c. Noted for Strength, Durability, Efficiency and Simplicity.

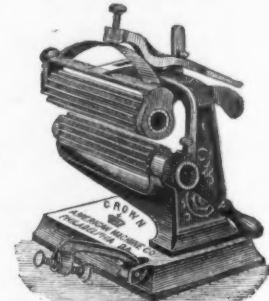
No. 2, Rolls 1 1/2 in. diam., 10 in. long. No. 2 1/2, Rolls 1 3/4 in. diam., 12 in. long. No. 3, Rolls 1 3/4 in. diam., 12 in. long. No. 4, Rolls 2 in. diam., 12 in. long.



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with valuable improvements over other style Machines, Patent Spring Arrangement and Clamping Device. Noted for Superiority of Finish and Practical Advantages. The leading Machine in the market.

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WARRANTED!!



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The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

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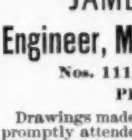
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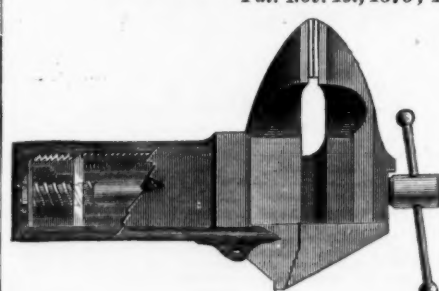
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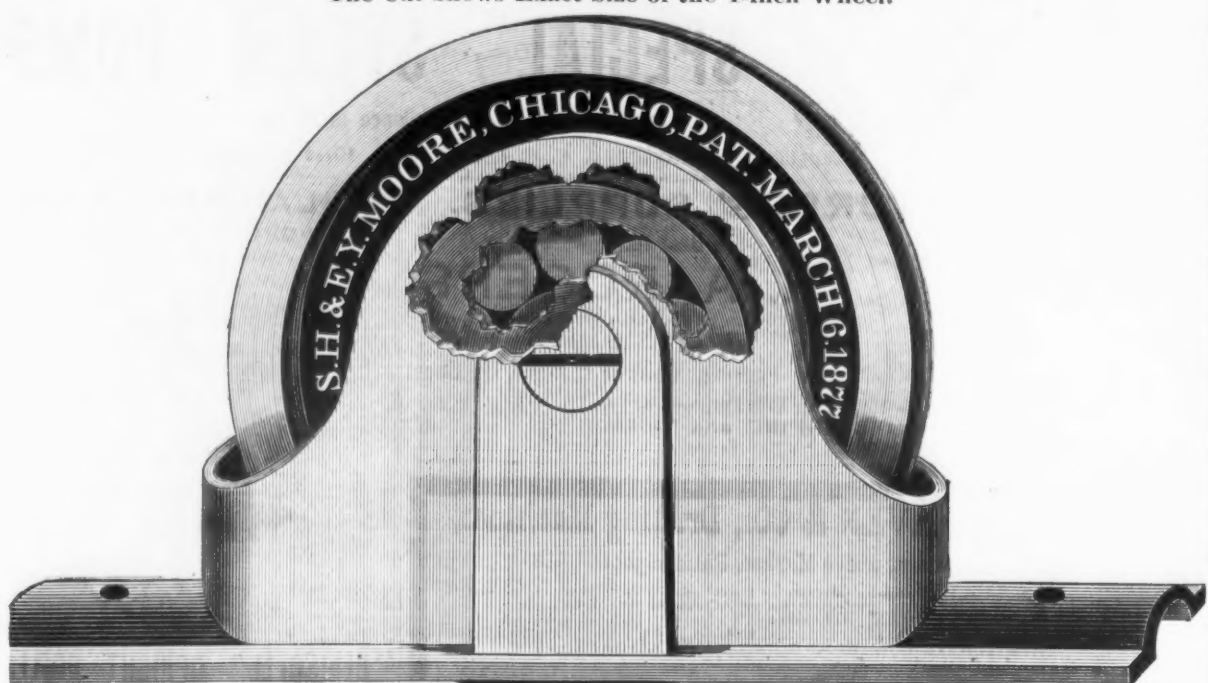


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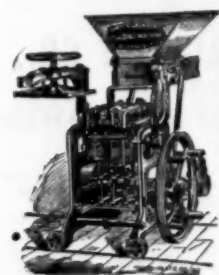


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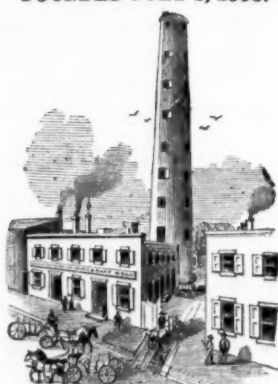
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Emery—American.....	dia 1 1/2	
Stubs' Lapers, genuine, 3 in., 50 1/2; 5 1/2, 55; 6 1/2, 58 1/2; 7 1/2, 62 1/2; 8 1/2, 65 1/2		
M., B. & D., solid cast steel, adze eye, No. 1, \$10; 1 1/2, \$12 1/2; 2, \$14 1/2; 2 1/2, \$16 1/2; 3, \$18 1/2; 3 1/2, \$20 1/2; 4, \$22 1/2; 4 1/2, \$24 1/2; 5, \$26 1/2; 5 1/2, \$28 1/2; 6, \$30 1/2; 6 1/2, \$32 1/2; 7, \$34 1/2; 7 1/2, \$36 1/2; 8, \$38 1/2; 8 1/2, \$40 1/2; 9, \$42 1/2; 9 1/2, \$44 1/2; 10, \$46 1/2; 10 1/2, \$48 1/2; 11, \$50 1/2; 11 1/2, \$52 1/2; 12, \$54 1/2; 12 1/2, \$56 1/2; 13, \$58 1/2; 13 1/2, \$60 1/2; 14, \$62 1/2; 14 1/2, \$64 1/2; 15, \$66 1/2; 15 1/2, \$68 1/2; 16, \$70 1/2; 16 1/2, \$72 1/2; 17, \$74 1/2; 17 1/2, \$76 1/2; 18, \$78 1/2; 18 1/2, \$80 1/2; 19, \$82 1/2; 19 1/2, \$84 1/2; 20, \$86 1/2; 20 1/2, \$88 1/2; 21, \$90 1/2; 21 1/2, \$92 1/2; 22, \$94 1/2; 22 1/2, \$96 1/2; 23, \$98 1/2; 23 1/2, \$100 1/2; 24, \$102 1/2; 24 1/2, \$104 1/2; 25, \$106 1/2; 25 1/2, \$108 1/2; 26, \$110 1/2; 26 1/2, \$112 1/2; 27, \$114 1/2; 27 1/2, \$116 1/2; 28, \$118 1/2; 28 1/2, \$120 1/2; 29, \$122 1/2; 29 1/2, \$124 1/2; 30, \$126 1/2; 30 1/2, \$128 1/2; 31, \$130 1/2; 31 1/2, \$132 1/2; 32, \$134 1/2; 32 1/2, \$136 1/2; 33, \$138 1/2; 33 1/2, \$140 1/2; 34, \$142 1/2; 34 1/2, \$144 1/2; 35, \$146 1/2; 35 1/2, \$148 1/2; 36, \$150 1/2; 36 1/2, \$152 1/2; 37, \$154 1/2; 37 1/2, \$156 1/2; 38, \$158 1/2; 38 1/2, \$160 1/2; 39, \$162 1/2; 39 1/2, \$164 1/2; 40, \$166 1/2; 40 1/2, \$168 1/2; 41, \$170 1/2; 41 1/2, \$172 1/2; 42, \$174 1/2; 42 1/2, \$176 1/2; 43, \$178 1/2; 43 1/2, \$180 1/2; 44, \$182 1/2; 44 1/2, \$184 1/2; 45, \$186 1/2; 45 1/2, \$188 1/2; 46, \$190 1/2; 46 1/2, \$192 1/2; 47, \$194 1/2; 47 1/2, \$196 1/2; 48, \$198 1/2; 48 1/2, \$200 1/2; 49, \$202 1/2; 49 1/2, \$204 1/2; 50, \$206 1/2; 50 1/2, \$208 1/2; 51, \$210 1/2; 51 1/2, \$212 1/2; 52, \$214 1/2; 52 1/2, \$216 1/2; 53, \$218 1/2; 53 1/2, \$220 1/2; 54, \$222 1/2; 54 1/2, \$224 1/2; 55, \$226 1/2; 55 1/2, \$228 1/2; 56, \$230 1/2; 56 1/2, \$232 1/2; 57, \$234 1/2; 57 1/2, \$236 1/2; 58, \$238 1/2; 58 1/2, \$240 1/2; 59, \$242 1/2; 59 1/2, \$244 1/2; 60, \$246 1/2; 60 1/2, \$248 1/2; 61, \$250 1/2; 61 1/2, \$252 1/2; 62, \$254 1/2; 62 1/2, \$256 1/2; 63, \$258 1/2; 63 1/2, \$260 1/2; 64, \$262 1/2; 64 1/2, \$264 1/2; 65, \$266 1/2; 65 1/2, \$268 1/2; 66, \$270 1/2; 66 1/2, \$272 1/2; 67, \$274 1/2; 67 1/2, \$276 1/2; 68, \$278 1/2; 68 1/2, \$280 1/2; 69, \$282 1/2; 69 1/2, \$284 1/2; 70, \$286 1/2; 70 1/2, \$288 1/2; 71, \$290 1/2; 71 1/2, \$292 1/2; 72, \$294 1/2; 72 1/2, \$296 1/2; 73, \$298 1/2; 73 1/2, \$300 1/2; 74, \$302 1/2; 74 1/2, \$304 1/2; 75, \$306 1/2; 75 1/2, \$308 1/2; 76, \$310 1/2; 76 1/2, \$312 1/2; 77, \$314 1/2; 77 1/2, \$316 1/2; 78, \$318 1/2; 78 1/2, \$320 1/2; 79, \$322 1/2; 79 1/2, \$324 1/2; 80, \$326 1/2; 80 1/2, \$328 1/2; 81, \$330 1/2; 81 1/2, \$332 1/2; 82, \$334 1/2; 82 1/2, \$336 1/2; 83, \$338 1/2; 83 1/2, \$340 1/2; 84, \$342 1/2; 84 1/2, \$344 1/2; 85, \$346 1/2; 85 1/2, \$348 1/2; 86, \$350 1/2; 86 1/2, \$352 1/2; 87, \$354 1/2; 87 1/2, \$356 1/2; 88, \$358 1/2; 88 1/2, \$360 1/2; 89, \$362 1/2; 89 1/2, \$364 1/2; 90, \$366 1/2; 90 1/2, \$368 1/2; 91, \$370 1/2; 91 1/2, \$372 1/2; 92, \$374 1/2; 92 1/2, \$376 1/2; 93, \$378 1/2; 93 1/2, \$380 1/2; 94, \$382 1/2; 94 1/2, \$384 1/2; 95, \$386 1/2; 95 1/2, \$388 1/2; 96, \$390 1/2; 96 1/2, \$392 1/2; 97, \$394 1/2; 97 1/2, \$396 1/2; 98, \$398 1/2; 98 1/2, \$400 1/2; 99, \$402 1/2; 99 1/2, \$404 1/2; 100, \$406 1/2; 100 1/2, \$408 1/2; 101, \$410 1/2; 101 1/2, \$412 1/2; 102, \$414 1/2; 102 1/2, \$416 1/2; 103, \$418 1/2; 103 1/2, \$420 1/2; 104, \$422 1/2; 104 1/2, \$424 1/2; 105, \$426 1/2; 105 1/2, \$428 1/2; 106, \$430 1/2; 106 1/2, \$432 1/2; 107, \$434 1/2; 107 1/2,		

Sellers.—Sandwich Mfg. Co.'s—
Shells.

Cotton Gins.—Carver, with 10 in. Saws, \$6 25 a saw, net
12 in. Saws \$4.00 a saw.....

Cultivators.—"Buckeye" (shovel)..... \$..... \$39 25

Draw Bars.—Steel Pointed..... \$..... \$ 26

Drum Cages.—
Cutter's Hoof 17 1/2 in. girth..... dia 30
Excelsior Drag Saw with Log Trucks..... dia 20

Fanning Mills.—Nash & Co's..... dia 25

Feed Cutters.—Burdick National..... new list, net.....
Sawyer..... dia 25
Bowman's Lever Cutter, \$6 25.....

Filles.—Black Diamond Mill..... dia 37 1/2
"Bastard"..... dia 37 1/2
"Paper".....

Forge and Blowers.—
Keystone Portable Forge Co.'s..... dia 15
"Farm".....

Grades and Cans.—
A—Horse, 30 lb Hay and Manure Forge..... dia 15
"new list"..... dia 15
Gardner's "Double Wheel Hoe"..... new list, dia 15 1/2
Allen's "Double Wheel Hoe"..... new list, dia 25
"Combined Drill and Wheel Hoe"..... new list, dia 25
"Excelsior"..... \$13 00

Grain Registers.—"Excelsior"..... \$13 00

Grinding Mills.—
Sedgwick's "Nutmeg" Mill, 10 in. dia..... dia 20
Brozard's French Burr Mill, 10 in. dia..... dia 5 1/2
"Corn and C. Mill"..... dia 10
Handley's "Post" Hoe and Rake..... \$14 00

Hoes.—
No. 2 Fork, Hoe and Rake..... new list, dia 10
"Combined Drill and Wheel Hoe"..... new list, dia 10
Handley's "Champion".....

Hay and Cotton Presses.—
Decker's..... dia 10
"Perpetual"..... dia 10

Hay Knives.—
No. 1 Fork Co's..... dia 12 1/2
"Lightning" Weymouth's..... \$ dia 12 1/2
Horse Nails.—National Patent Pointed..... dia 20
Sedgwick's "Round" Nail, 10 in. dia..... dia 20

Horse Powers.—
No. 1 Fork Co's..... extra finished..... 25
"Combined Drill and Wheel Hoe"..... dia 10
Wheeler's "Railway"..... dia 10
Sandwich Lever..... dia 10

Hose.—
Boston Belting Co.'s Rubber Medium Sizes..... dia 50
"S. S. Iz. Hydraulic" dia 6 1/2

Ice Tools.—
Law Mowers.—Chatter Oak & Axhead dia 15

Money Drawers.—
Pierpont & Co.'s Excelsior..... per doz \$38 00 net
Nails.—Wholesale Riverside Iron Co's..... \$25 rates
"Combined Drill and Wheel Hoe"..... dia 10
Boston Belting Co.'s Rubber Pure..... dia 25
"No. 1 Fork Co's"..... dia 10
Pumps.—Avery's Cast and Steel..... new list, dia 10
Avery's Siskiy Flow..... new list, dia 25
"Combined Drill and Wheel Hoe"..... dia 10
Plow Sulkies.—Buckeye..... \$27 00 net

Post Hole Augers.—Clark's Patent.....
No. 2, dia 12, \$30; No. 3, \$32..... per doz \$5 70 net
Pulleys.—5 inch..... dia 25
1 inch..... per doz 23 00 net
"Combined Drill and Wheel Hoe"..... dia 10

Rakes.—Advance Sulkies..... new list, dia 25
St. Louis Reinviving 14 tooth..... 4 15 net
"Hand Hay Rake"..... per doz \$25

Reaper Knives and Sections.—
J. B. James & Co.'s Knives..... dia 40
"Combined Drill and Wheel Hoe"..... dia 10

Road Scrapers.—Steel..... each \$30

Saws.—Currier's..... dia 10 1/2
Sevens.—Dunn Edge Tool Co's..... dia 25
Shovel.—"Combined Drill and Wheel Hoe"..... dia 10
Skein.—"Combined Drill and Wheel Hoe"..... dia 10
Sleds and Cudgels.—Seymour Mfg. Co's..... dia 25
Sleighs M. Chubbey's "Bait Case Mills"..... dia 20
"Combined Drill and Wheel Hoe"..... dia 10

Springs.—Cleveland Spring Co.'s.....
Carriage and Express..... \$ 14 1/2
Stump Pullers.—
Trade..... dia 15
Manfield..... dia 10

Timble Saws.—Waterbury's..... dia 20 1/2

Wheelbarrows.—Champion Iron & Steel Co's \$15 00
"Combined Drill and Wheel Hoe"..... dia 10
"Garden"..... \$ dia 30

Wagons.—Waterbury Farm Wagons—
Timble Steel.....

Wires.—In \$66; 3 in. \$67 50; 3 in. \$70; 3 1/4 in. \$71
Wire Bale Ties.—Buckeye Double Twist..... net list
Decker's Adjustable.....

St. Louis Metal Market.

(Correlated Weekly by Messrs. R. Sellers & Co.)

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Animal Pokes... \$6.50 @ doz. net

Aple Parera.....	Conqueror.....	7	diz 8 75
Hudson's Rotary.....		6	75
Axes.....	-Wm. Mann's, Red Warrior.....	9	diz 9 50
Hatched.....	Marshall.....	10	9 75
Handled.....		10	\$3 extra
Doubt Billed.....		19	" 40
".....		12	" 10
Axles.....	-Jones, Henry & Co.'s Patent Lubri-		
cating, Half Patent, Sweeled Taper, Plain Ta-			
per.....		dis 35	50
Common Axes (Pat. Lubricating.....)			
unward.....		9	b. 55c
".....	back.....	5	50
Babbit Metal.....			
No.....	1 2 3 4 5 6 7 8 9 10 11 12		Genuine.....
Belows.....	-beat 5 L, Louis make, new list.....	5	c 9 b.
Bells.....	-Troy, Church School and Farm Bells.....	8	30
Bellprovs.....	and Improved.....	15	lin. 40
Bells.....	17in., \$250 19in., \$300 21in., \$350		
Beltine.....	-Boston Belting Co.'s Rubber, dis 50-101		
Belted.....	-Cambridge, \$100 12in., \$125 14in., \$150		
Blue Grass Strippers.....	-Cambridge Leather.....	dis 35	
Boliers.....	-Farmers' Profit Reel Boliers.....	dis 20	
Caldrans.....		dis 25	
Bolting Cloth.....	-New gold list.....	net	
Bols.....	-Armstrong, Bell & Co.'s Carriage & Tire.....	to 75 s	
Broadcast Seeders.....	Academy finish.....	Power dis 30 s	
Bugles.....	-Favorite Coronado finish.....	\$110 60	
Leather.....		100	
".....	& top.....	140 00	
Buttons.....	-Julien, No. 2, \$710; No. 5, \$750; No. 8,		
Cider Mills.....		dis 25 s	
Calf Buckes.....	-Senior Buckeye Junior, 1800.....	dis 25 s	
Calf Buckes.....	-Superior.....	dis 25 s	
Corn Stalk Cutters.....	-Perkin.....	dis 25 s	
Corn Drill.....	-Campbell.....	\$19 10	
Corn Planters.....	-Seymour Mfg. Co.'s solid steel, back.....	\$40 50	
Corn Planters.....	-Champion Horse.....	\$41 40	

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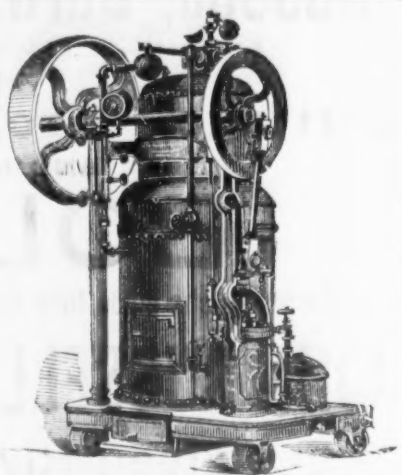
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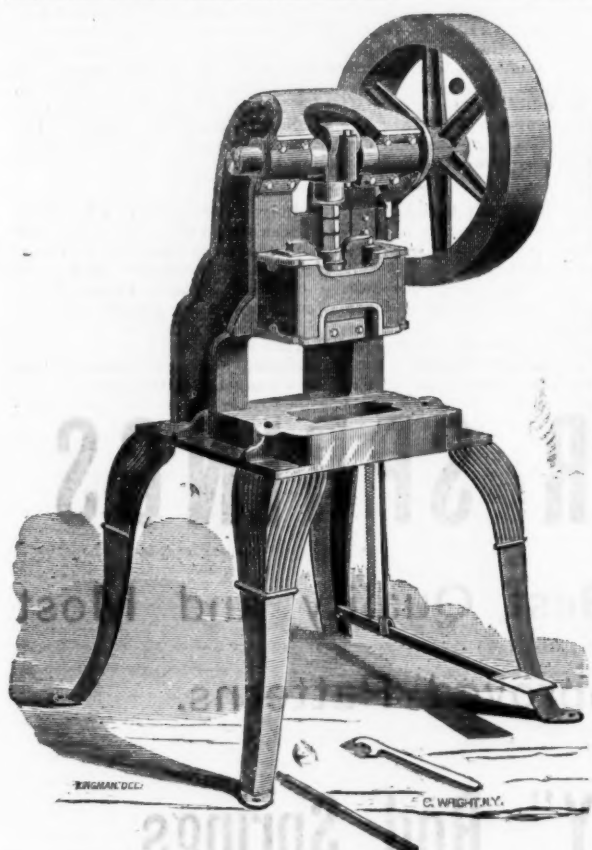


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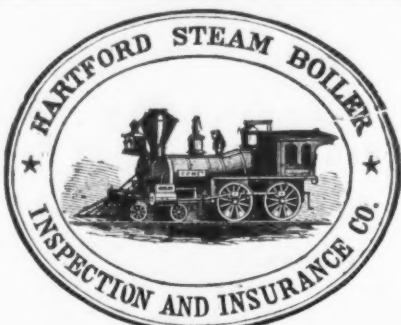
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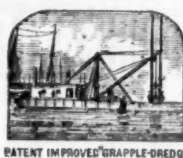
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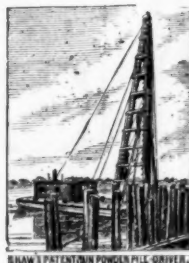
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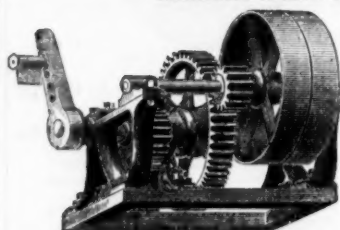
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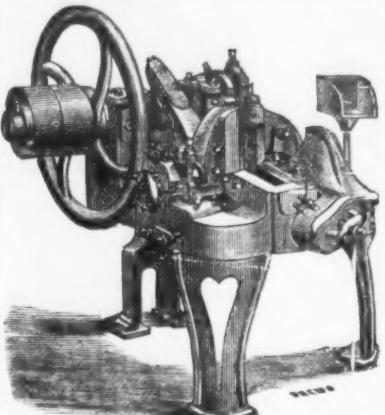
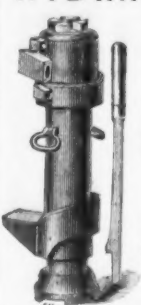
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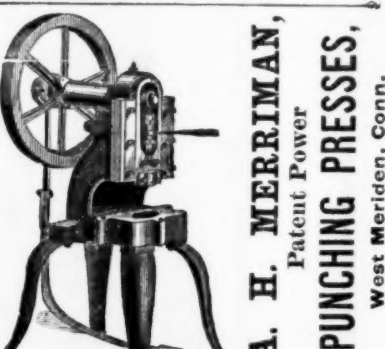
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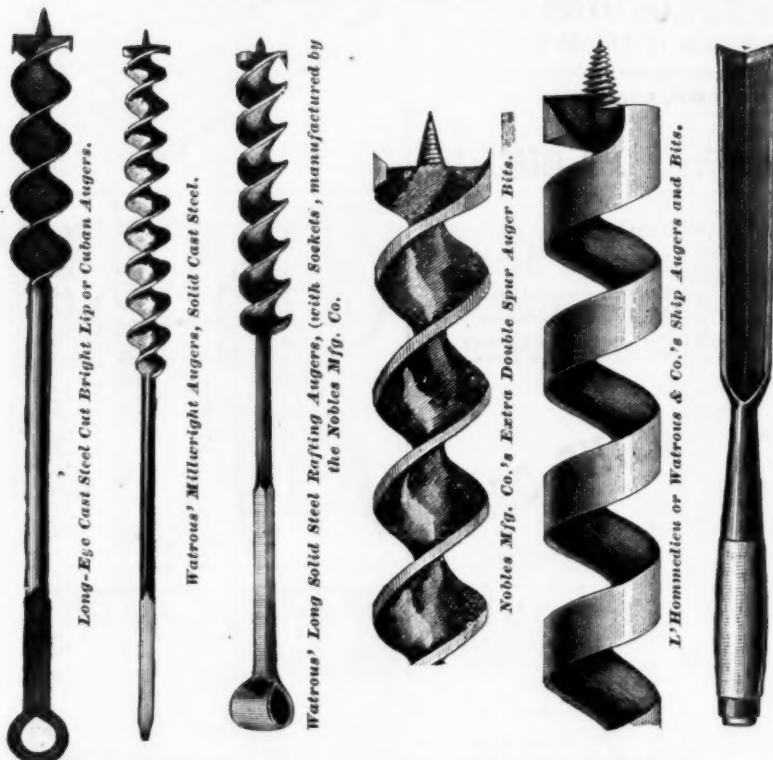
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See cut of Elevator Hoisting Machine in issue of Mar. 21, 1878, page 37.

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TRIAL OF THE IMPROVED LIGHTNING SAW.

The Emperor, Dom Pedro, accompanied by Director General Goshorn, Superintendent Albert, and others, visited Machinery Hall, at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. BOYNTON, of New York, they witnessed a trial of the *New Lightning Saw*, patented March 26, 1876. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corliss, Morell, Lynch, and other members of the commission, witnessed the trials and timed the cutting. The Emperor remarked, That was fast, very fast cutting. Last evening the Emperor made another examination of the saw.—*Philadelphia Press*, June 30.

"BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, eleven inches in diameter, was sawed off, with a four-and-a-half-foot lightning cross-cut, by two men, in precisely six seconds as timed by the chairman of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in four minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation."

Received Medal and Highest Award of Centennial World's Fair, 1876.

\$1000 Challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

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